

AMENDMENTS
TO
THE WATER QUALITY CONTROL PLAN
FOR THE SACRAMENTO RIVER AND
SAN JOAQUIN RIVER BASINS
FOR
THE CONTROL OF AGRICULTURAL
SUBSURFACE DRAINAGE DISCHARGES
RESPONSE TO COMMENTS RECEIVED ON
PUBLIC WORKSHOPS CONDUCTED ON
23 JUNE 1995, 22 SEPTEMBER 1995,
AND 7 DECEMBER 1995

APRIL 1996

California Regional Water Quality Control Board
Central Valley Region

Amendments
to
the Water Quality Control Plan for
the Sacramento River and San Joaquin River Basins
for
The Control of Agricultural
Subsurface Drainage Discharges

Response to Comments Received on Public Workshops
Conducted on 23 June 1995, 22 September,
and 7 December 1995

California Valley Region Water Quality Control Board
Board Members

Karl E. Longley, Chair
Ed J. Schnabel, Vice Chair
Hank Abraham
Steven Butler
Hugh V. Johns
Ernie Pfanner
Patricia M. Smith
Clifford C. Wisdom

William H. Crooks, Executive Officer

DRAFT REPORT - APRIL 1996
California Regional Water Quality Control Board
Central Valley Region
Sacramento, CA

Table of Contents

	<u>Page</u>
Introduction	1
 PART II	
Beneficial Uses	3
Conveyance of Agricultural Drainage	4
Limited Beneficial Uses	4
Upslope Selenium Sources	5
Flexibility	5
Designation of Specific Beneficial Uses	6
Watershed Approach	10
Public Health Risks	11
 Water Quality Objectives	 12
Narrative Objectives	12
Potential Influence of Sulfate Concentrations	13
Background Concentrations	13
U.S. EPA's Selenium Criteria	14
Appropriate Selenium Objective	14
Load vs. Concentration Based Objectives	16
Biologically Based Objectives	17
 Implementation	 17
Policy	18
Policy b	18
Policy e	19
Policy f	20
Policy g	21
Prohibitions	22
Prohibition of Discharge	22
Load Caps	22
Waiver of Discharge Prohibition	23
Control Actions	24
Compliance	24
Concentrations vs. Loads	26
Use of Assimilative Capacities	26
WDR Effluent Limits	27
WDR Review Schedule	27
Load Reductions	28
Use of TMDLs	29
Land Retirement	30
Land Use	31
Treatment	31
Extending the Bypass	32

Withholding Supply Water	32
Water Conservation Efforts	33
Time Schedule for Compliance	33
Compliance Monitoring	37
Economics	37
Maintaining Crop Productivity	38
Salinity	38
Establishing an Objective	39
Wetland Management	39
General	40
Terminology	40
Load Estimates	40
San Joaquin River Flow Augmentation	41
Evaporation Ponds	41
Load Reductions vs. Water Quality	41
Calculated Load Reductions	42
Proportioning Selenium Loads	42
Other Constituents of Concern	42
Appendix I. Copies of Comment Letters Received at Public Workshops	45

Tables

Table 1. Summary of Comment Letters Received on Basin Plan Amendment Workshop Staff Reports	2
--	---

INTRODUCTION

This document contains the responses to comments received on three separate staff reports on the proposed Basin Plan Amendment to regulate agricultural subsurface drainage. These three reports were presented at public workshops on 23 June 1995, 22 September 1995, and 7 December 1995 and covered beneficial uses and water quality criteria, water quality objectives and implementation program, and compliance time schedule, respectively. The responses have been grouped by topic following a similar outline to the Basin Plan amendment. A list of written comments received is presented in Table 1. Appendix 1 contains copies of the actual written comments.

Where possible, a single response by topic has been prepared by staff. The majority of the comments prior to the response are quoted directly from the letters received; however, in some cases, staff have summarized the comments in order to provide a more direct response.

TABLE 1. SUMMARY OF COMMENT LETTERS RECEIVED ON BASIN PLAN AMENDMENT WORKSHOP STAFF REPORTS

Ambach, 12/5/95 Cecelia Ambach	Miller, 12/7/95 Congressman George Miller	Stockton East Water District, 10/4/95 Kama E. Harrigfeld, Attorney-at-Law Neumiller & Beardslee
Bay Institute, 10/2/95 The Bay Institute of San Francisco Gary Bobker, Policy analyst	Patagonia, 10/4/95 Carla Bard, Former Chair of the State Water Resources Control Board	Stockton East Water District, 12/8/95 Jeanne M. Zolezzi, Attorney-at-Law Neumiller & Beardslee
Bay Institute, EDF, NRDC; 7/6/95 (Bay Institute of San Francisco, Environmental Defense Fund, and Natural Resources Defense Council) Gary Bobker, Thomas J. Gruff; Hamilton Candee	Patagonia, 12/5/95 Carla Bard, Former Chair of the SWRCB	SWRCB: DWQ, 10/6/95 State Water Resources Control Board Jesse M. Diaz, Chief Division of Water Quality
Bay Institute, EDF, NRDC; 12/7/95 (Bay Institute of San Francisco, Environmental Defense Fund, and Natural Resources Defense Council) Gary Bobker, Thomas J. Gruff; Hamilton Candee	Porgans, 10/3/95 Patrick J. Porgans, Government Regulatory Specialist	USEPA, 7/14/95 U.S. Environmental Protection Agency Maria Rea, Chief Northern California and Hawaii Watershed Section Region IX
Broadview Water District, 9/26/95 David G. Cone, Manager	Porgans, 12/8/95 Patrick J. Porgans, Government Regulatory Specialist, H.F. Brennan and Associates	USEPA, 11/22/95 United States Environmental Protection Agency Alexis Strauss, Director, Water Management Division
Broadview Water District, 12/8/95 David G. Cone, Manager	SJR Exchange Contractors, 10/2/95 San Joaquin River Exchange Contractors Michael V. Sexton, Attorney-at-Law, Minasian, et al.	USEPA, 1/8/96 United States Environmental Protection Agency Amy Zimpler, Chief Watershed Protection Branch, Region IX
California Farm Bureau Federation, 7/6/95 William I. DuBois, Consultant	SLDMWA, 7/6/95 San Luis & Delta Mendota Water Authority Daniel G. Nelson, Executive Director	USFWS: Frazer, 12/12/95 U.S. Fish and Wildlife Service Scott Frazer, Refuge Operations Specialist San Luis National Wildlife Refuge Complex
Central Delta Water Agency, 9/29/95 Dante John Nomenclini, Manager and Co-Counsel	SLDMWA, 10/4/95 San Luis & Delta Mendota Water Authority Dan Nelson, Executive Director	USFWS: Medlin, 7/12/95 U.S. Fish and Wildlife Service Joel A. Medlin, Field Supervisor Sacramento Field Office
City of Antioch, 12/11/95 Stanford E. Davis, P.E., Director of Public Works	SLDMWA, 12/11/95 San Luis & Delta Mendota Water Authority Dan Nelson, Executive Director	USFWS: Medlin, 10/4/95 United States Fish and Wildlife Service Joel A. Medlin, Field Supervisor Sacramento Field Office
City of Gustine, 12/6/95 Mark D. Melville, City Manager	Smith, 10/4/95 Telix E. Smith	USFWS: Zahn, 10/4/95 United States Fish and Wildlife Service Gary Zahn, Project Leader San Luis National Wildlife Refuge Complex
Contra Costa County, 10/4/95 Community Development Department Harvey E. Bragdon, Director	Smith, 12/14/95 Telix E. Smith	
Contra Costa Water District, 10/4/95 Richard A. Denton, Acting Water Resources Manager	South Delta Water Agency: Hildebrand, 9/12/95 Alex Hildebrand, Secretary	
Contra Costa Water District, 12/7/95 Richard A. Denton, Water Resources Manager	South Delta Water Agency: Herrick, 10/4/95 John Herrick, Esq., Attorney for SDWA	
EDF, 10/4/95 Environmental Defense Fund Terry Young, Senior Consulting Scientist	South Delta Water Agency: Herrick, 12/7/95 John Herrick, Esq., Attorney for SDWA	
Grassland Water District, 10/4/95 Don Marciocchi, General Manager	Stockton East Water District, 7/7/95 Kama E. Harrigfeld, Attorney at Law Neumiller & Beardslee	

BENEFICIAL USES

Before listing and responding to comments regarding the beneficial uses identified by staff, it is important to reiterate some legal and administrative factors considered by staff in evaluating the uses for the subject water bodies. These factors are important as they set the framework from which responses to many comments were structured.

Procedures used by staff in identifying beneficial uses for the water bodies of the Grassland watershed are specified in the California Water Code and in the Clean Water Act. The Water Code (§13240) authorizes the Regional Board to *adopt water quality control plans for all areas within the region* and to periodically review the plans. The plans are to include beneficial uses of the water body to be protected, water quality objectives, and an implementation program for achieving water quality objectives (Water Code §13050(j) and §13240-13247). Beneficial uses that may be protected include, but are not limited to, *domestic, municipal, agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation of fish, wildlife, and other aquatic resources or preserves* (Water Code §13050(f)). When setting water quality objectives, the Water Code (§13241) requires the Regional Board to consider, among other things, *the past, present and probable future beneficial uses of water and the water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area*. Additionally, §13263(g) clarifies the use of a water body for waste discharge as it states that *all discharges of waste into waters of the state are privileges and not rights* and that no discharge of waste, whether permitted or not constitutes a right to continue that discharge. As such waste discharge, assimilation, and transport are not recognized beneficial uses under state statutes.

Section 303(c)(2)(A) of the Clean Water Act and the regulations codified in 40 CFR §131 require states to adopt water quality standards to protect public health or welfare, enhance the quality of water and serve the purpose of the Act. "Serve the purpose of the Act," as defined in §101(a)(2) and 303c of the Act means water quality standards should provide wherever attainable, water quality for the protection and propagation of fish, shellfish, and wildlife, and recreation in and on the water (fishable/swimmable); and consider at a minimum the use and value of State waters for public water supplies, propagation of fish and wildlife, recreation, agriculture and industrial purposes, and navigation. States are permitted to consider other uses except for waste transport and assimilation (40 CFR 131.10(a)).

In addition to the above direction, States are required to include existing uses and those that are deemed attainable. Existing uses are defined as those uses actually attained in the water body on or after November 28, 1975 (40 CFR §131.3(e)). Uses are deemed attainable if they can be achieved by the imposition of effluent limits required under Section 301(b) and 306 of the Act and cost-effective and reasonable best management practices for non-point source control (40 CFR 131.10(d)).

State law requires consideration of past uses in designating beneficial uses. Federal regulations require that existing uses be included as designated uses. Existing uses are defined, in the federal regulations, as uses which existed at any period since November 28, 1975, whether or not that use is currently being attained. California law does not define the time frame from which to evaluate past uses. In the evaluation of the beneficial uses of the water bodies of the Grassland watershed, 1975 was set as the time frame from which to evaluate past and existing uses. This determination was based on two reasons: 1) consistency with the federal regulations; and 2) 1975 was the year the first basin plan for the San Joaquin River Basin was adopted.

The Regional Board identified the beneficial uses of the wetland channels and of Mud Slough (north) and Salt Slough in compliance with the statutory and regulatory constraints. Many of the comments provided on the beneficial uses failed to recognize the legal requirements involved in water quality planning. Many of the responses to comments are framed with respect to the legal and regulatory constraints.

Conveyance of Agricultural Drainage

Agricultural drainage conveyance should be included as a beneficial use for Mud Slough (north) and Salt Slough. (SLDMWA, 12/11/95).

The report does not propose another alternative method of (subsurface drainage) discharge... when WILD and BIOL are proposed for Grassland wetland channels. A solution might be to condition the designation as having a priority below the use of the channels for subsurface agricultural drainage discharge. (CA Farm Bureau, 7/6/95).

The California Water Code considers waste discharge to waters of the state a privilege and not a right. Therefore, waste discharge can not take precedence over recognized beneficial uses. The Federal Clean Water Act does not recognize waste transport and assimilation as a beneficial uses of a water body. Thus, discharge of subsurface drainage can not be a protected use of the Grassland area water bodies and can not interfere with other recognized uses. In fact, discharge of agricultural subsurface drainage may be a factor that needs to be controlled in order to attain recognized beneficial uses (40 CFR 131.10(d)).

While the staff report does not propose...waste transport as a designated use, it does identify as part of Table 3, subsurface agricultural drainage as a current use of many of the wetland channels. ...You may find that clarification of this point in the Amendment is warranted. (USEPA, 7/14/95)

Tables 3 and 4 of the June 1995 staff report were meant to merely highlight the multiple use of the wetland channels. Those channels which were subject to use as wetland water supply conveyance and drainage conveyance are the ones in most danger of having wetland water supplies impaired. The Regional Board is aware of the legal and regulatory constraints including those in state law which recognizes waste discharge as a privilege that must not interfere with recognized beneficial uses.

Limited Beneficial Uses

Summarized: Limited warm freshwater habitat (WARM), agricultural (AGR), wildlife habitat (WILD) and warm water spawning (SPWN) should be designated for Mud Slough (north) and Salt Slough instead of full uses. (SLDMWA, 7/4/96)

Past, present, and potential future uses and uses which could be attained by considering reasonable control measures (e.g. nonpoint source pollution control through best management practices) were considered for these water bodies. Based on this evaluation, it was concluded that full attainment of these uses could be realized in Salt Slough. Mud Slough (north) should also attain full uses except for (AGR) which would be limited due to elevated natural salt and boron concentrations in addition to intermittent flow conditions. Physical constraints in the wetland channels (e.g. lack of appropriate habitat, intermittent flow and elevated natural boron and salt) preclude the full attainment of uses related to aquatic life and AGR. Therefore, a "limited WARM" designation was appropriate where "limited" recognizes the water bodies ability

to sustain aquatic life while not providing suitable habitat for propagation and enhancement. Also a "limited AGR" designation was appropriate.

The Basin Plan Amendment must better define the "limited" warm water habitat use and whether some distinction from a "full" warm water habitat use is intended. (USEPA, 7/14/95)

Channels used to supply water to wetlands are managed systems which do not have a natural flow component. These channels are subject to wide fluctuations in flow and experience periods of dryness. Additionally, these channels were constructed or highly modified prior to 1975 for the purpose of efficiently conveying water supplies. As such, since 1975, these channels have lacked natural features which are essential habitat for the propagation of aquatic life. Therefore, these channels may be capable of sustaining aquatic life, while there is water in them, but are not capable of enhancement and propagation. In contrast, water bodies with full warm freshwater aquatic life beneficial uses are capable of enhancing and propagating warm habitat aquatic life in addition to sustaining it. This difference has been footnoted in the proposed Basin Plan amendment.

Upslope Selenium Sources

High flows from the westside foothills create flooding problems and also discharge high selenium concentrated waters into the watershed. It should be noted that agricultural users with subsurface tile systems can not control these flows. (SLDMWA, 7/4/95)

Erosion from the upper portion of the watershed and deposition on the lower watershed has occurred throughout geologic time and continues presently. Accelerated erosion from land use practices in the upper watershed and along riparian corridors of Panoche Creek probably also contribute to selenium loading of the Drainage Problem Area. The amount of selenium loading to the Drainage Problem Area from the Panoche Creek Watershed has not been quantified. However, the current water quality problems arise from irrigation, collection of subsurface drainage, and discharge of subsurface drainage to waterways of the Grassland watershed which is the focus of this Basin Plan amendment. Regardless of the circumstances, the drainers have made the choice to discharge agricultural subsurface drainage to surface waters. This discharge is at the heart of the water quality problems.

The potential impact of upslope contribution to subsurface drainage facilities has been noted as a topic in need of further study in Part VI of the March 1996 staff report. Panoche Creek Watershed has also been noted as a priority area for future funding under "Actions Recommended for Implementation by Other Agencies: State Water Board".

Flexibility

It may not be possible to meet a high level of expectations for the beneficial uses in these channels. Beneficial uses and subsequent water quality criteria should not be locked in at this time but should be flexible for future considerations. (SLDMWA, 7/4/95)

Both federal and state statute clearly outlined the procedures necessary to determine beneficial uses for water quality control. These procedures are not predicated on the ability of the discharger to meet water quality objectives. State and federal law do allow periodic review of beneficial use designations as changes take place in water conditions.

Designation of Specific Beneficial Uses

... we recommend that COMM be adopted as a beneficial use of the San Joaquin River. (USEPA, 1/8/96)

This basin plan amendment has focused on evaluating and designating beneficial uses for water bodies contained within the Grassland Watershed. The evaluation did not include the San Joaquin River which has already had beneficial uses designated through a public review process. Reevaluation of previously designated uses would be more appropriate during the triennial review process and has not been included in this amendment.

We recommend that the Regional Board designate BIOL for Mud Slough (north). (Bay Institute, EDF, NRDC; 7/6/95)

... we recommend that BIOL be adopted as a beneficial use of Mud Slough. (USEPA, 1/8/96)

The Basin Plan for the Sacramento River and San Joaquin River Basins defines BIOL as uses of water that support designated areas or habitats, such as established refuges, parks, sanctuaries, ecological reserves, or areas of special significance where the preservation or enhancement of natural resources requires special protection. Mud Slough (north) is not a source of water for the refuges which it borders. Since flows in Mud Slough (north) are not used for management of these areas, it would not be appropriate to designate this use for Mud Slough (north) at this time. As water management in the area evolves, the BIOL designation may be reviewed.

... we recommend that REC-2 be adopted as a beneficial use of Mud and Salt Slough. (USEPA, 1/8/96)

REC-2 has been identified as a beneficial use of both Mud Slough (north) and Salt Slough.

Summary: The beneficial use of preservation of rare and endangered species (RARE) was suggested as an identified use for the sloughs. (The Bay Institute, EDF, and NRDC; 7/6/95)

The Regional Board adopted Resolution 95-12, adopting the revised Water Quality Control Plan for the Sacramento River and San Joaquin River Basins (Basin Plan). Within this resolution three provisions were included to protect threatened and endangered species. These provisions read as follows:

1. The State Water Resources Control Board will work with the Department of Fish and Game (DFG) to ensure that threatened and endangered species are protected, pursuant to Fish and Game Code Section 2055.
2. Within three years after DFG notifies the Regional Board that specific water bodies support threatened or endangered species and that scientific evidence indicates that certain existing water quality objectives for these water bodies do not adequately protect such species, the Regional Board shall determine, in consultation with DFG, whether these objectives are adequately protective. In cases where such existing objectives do not provide adequate protection for threatened and endangered species, the Regional Board shall develop and adopt adequately protective site-specific objectives for these constituents.

3. The Regional Board shall continue to implement provisions of existing state and federal laws regarding the discharge of toxic pollutants. In particular, the Regional Board shall issue National Pollutant Discharge Elimination System permits in compliance with the Porter-Cologne Water Quality Control Act and applicable state and federal regulation, including, but not limited to, 40 CFR, Section 122.44(d).

The Regional Board initiated consultations on 19 June 1995, with the DFG with respect to threatened and endangered species in the Grassland watershed as they may be impacted by the current Basin Plan amendment. As of this date, the Regional Board has not received the final, formal biological opinion. However, in a draft biological opinion (28 March 1996), DFG stipulated several monitoring provisions which if fully implemented will be unlikely to jeopardize the continued existence of listed species. In addition, the adverse impacts from incidental take of species would be minimized. The Regional Board will abide by the final provisions.

Summary: The designation of Mud Slough (north) and Salt Slough for cold freshwater habitat (COLD) was recommended based on the straying of chinook salmon into the sloughs during periods of high flow. (USEPA, The Bay Institute, EDF, and NRDC; 7/6/95)

... we recommend that MIGR be adopted as a beneficial use of Mud and Salt Slough. (USEPA, 1/8/96)

In evaluating aquatic life uses, the Regional Board considered present and past physical and biological conditions of the sloughs. For reasons previously indicated, conditions since 1975 were considered as the basis from which to evaluate past and existing uses. The primary factors that led to designation of warm freshwater aquatic life use and not cold freshwater aquatic life use were habitat conditions and fishery resources. Guidelines¹ from the USEPA state that subcategories of aquatic life beneficial use may be made on the basis of attainable habitat.

The primary factor for the designation of the sloughs as a warm freshwater aquatic habitat and not cold freshwater aquatic habitat was the evaluation of water temperature data. Data, from as early as 1938, was evaluated. This data is presented in another report². The historic data shows that water projects have not impacted temperature in the sloughs and that temperature characteristics have not changed since 1938.

Temperature data, in the sloughs, was evaluated with respect to its suitability to support a cold water species common to the San Joaquin Basin (chinook salmon). It was found that water temperatures were not suitable to support this species. Water temperatures in the sloughs vary from a mean of 48 °F in December and January (winter) to 79 °F in July and August (summer) and are only below 60 °F from November through February. The recommended National Marine Fisheries Service maximum temperature of 56.5 °F between mid-April and the end of September for chinook salmon, are exceeded in both sloughs. In addition, the critical temperature of 60 °F that is required for the production of viable eggs is greatly exceeded during most of the adult immigration period (mid-July through November). Also, the 54 °F maximum required prior to and during seaward migration of smolts is exceeded during the height of the emigration period (March to June).

¹ Water Quality Standards Handbook, EPA-823-B-93-002 Sept 1993 Sec 2.3

² Beneficial Uses Assessment of Mud Slough (north) and Salt Slough, CVRWQCB, 1996 (in draft).

In addition to temperature, substrate was also considered. It was concluded that the sloughs do not possess the appropriate substrate for spawning of many cold water species. Many cold water species, such as chinook salmon, require gravel beds for spawning. The substrate throughout Mud Slough (north) and Salt Slough is primarily fine grained. Thus, the sloughs do not poses appropriate habitat for spawning. Upstream of sloughs, in the man-made channels there is also a lack of appropriate habitat for spawning. Thus, migration designation for cold water species is not an appropriate designation.

The fishery resources of the sloughs were also considered. The presence of certain types of species are indicative of the type of habitat (cold versus warm). The species of fish most commonly detected in the sloughs were fathead minnow, common carp, inland silverside, and Sacramento blackfish. These species are associated with warm water ecosystems.

Although straying of chinook salmon is known to occur during periods of high flow in the sloughs, this straying may be due in part to current rearing practices in which salmon spend early life stages in hatcheries and are then transported by truck and released downstream. Due to these practices, the fish do not properly imprint their natal streams and consequently stray upon returning (personal communication: Bill Loudermilk, U.S. FWS, 1995). Migration of salmon into the San Joaquin River upstream of the Merced River confluence including, into Mud Slough (north) and Salt Slough is an aberration as it does not lead to spawning areas and results in productive losses. In recognition of this, DFG operates a fish barrier on the San Joaquin River downstream of the sloughs and upstream of the Merced River. This barrier reduces the amount of straying into the sloughs. It also reduces migration of salmon to the main stem of the San Joaquin River upstream of the Merced River. Under current management practices of Friant Dam, flows in the San Joaquin River upstream of the Merced River are made-up primarily from the sloughs. Upstream of the sloughs flows are very low and segments of the river are subject to frequent dryness.

It is uncertain if flows from Friant Dam will ever be released to aid in restoration of salmon populations. Current restorations by DFG and Fish and Wildlife Service (under the CVPIA) are focusing on the eastside tributaries of the San Joaquin River (Merced, Stanislaus, and Tuolumne Rivers). It is not known how the sloughs will need to be managed if flows from Friant Dam are restored to the lower San Joaquin River. At this point, use of flows from Friant Dam in salmon restoration appears to be highly unlikely.

This issue of whether a stream should be designated as a coldwater fishery is addressed in Section 4.4.2 of the Water Quality Standards Handbook (USEPA, 1993). In this section, it is stated that presence of a marginal population of coldwater species, which is an artifact "should not be employed to mandate a more stringent use (true coldwater fishery) where natural conditions are not suitable for that use." In the case of Mud Slough (north), Salt Slough, and the wetland channels, neither the temperature or habitat of these water bodies support a cold water fishery.

Based on the evidence presented above, the Regional Board designated only warm freshwater aquatic habitat for the sloughs. The evidence does not support designating the sloughs for cold water migration, spawning, or early development. In addition, it appears that salmon stray into the sloughs because of the lack of attractive flows in the main stem of the San Joaquin River and because of improper imprinting of natal streams by hatchery raised salmon. The lack of attractive flows in some years in the Merced River also contributes to straying. These factors, however, are not reasons for designating the sloughs for cold water aquatic habitat or migration.

....the increased incidental migration of cold water fishes...is likely to occur as a result of increased flows in Mud Slough following the reopening of the San Luis Drain. (USEPA, 7/14/95)

The Basin Plan amendment designates beneficial uses based on habitat conditions. Regardless of flow, Mud Slough (north) does not support cold water fisheries and it has been neither a past (since at least 1975), present, or possible future use of this water body. Currently, subsurface drainage is discharged either through Mud Slough (north) or Salt Slough. In recent years (since 1993), subsurface drainage has been discharged primarily through Salt Slough. Switching the discharge of the subsurface drainage exclusively to Mud Slough (north) would increase flow in Mud Slough (north) but flows in Salt Slough would decrease by a similar magnitude and there would be no net increase in discharge of the Grassland watershed to the San Joaquin River. Therefore, there should be no net increase in straying.

Presently, flows in Mud Slough (north) during the fall run migration period are in the order of 8 to 45 cubic feet per second (cfs) (CVRWQCB, 1996 draft). Discharge in Salt Slough (which receives the subsurface drainage) is between 220 to 290 cfs during August and drops off sharply in the subsequent months of the fall migration to between 100 to 150 cfs. This decrease is due to the end of the crop irrigation season and the beginning of the wetland flood-up. The flows in the sloughs are rather low during the peak of the fall chinook salmon migration period. The problem with straying of salmon to the sloughs, stems not so much from the attractive flows in the sloughs but rather from the low flow in the San Joaquin River upstream of the sloughs. This low flow results from diversion of upper San Joaquin River flows at Millerton Reservoir. The upstream diversion is in part why the fall fish barrier is placed on the San Joaquin River just upstream of the Merced River confluence rather than on the sloughs.

Further investigation may be necessary in order to identify if additional beneficial uses should be designated for Mud Slough (north) and Salt Slough, in order to restore water quality conditions and environmental values of these areas which existed prior to their current state as effluent-dominated water bodies. (The Bay Institute, EDF, and NRDC, 7/6/95)

Among the factors considered in the evaluation of beneficial uses of the sloughs was the existing uses (uses attained on or since 1975) and those uses which could be attained by the control of all factors which affect water quality in the region. As was noted in the staff report and the workshop of 23 June 1995, the hydrology of the Grassland watershed was irreversibly altered as a result of the Central Valley Project. The factors which drastically altered the hydrology occurred outside of the watershed and prior to 1975 (the time-frame from which past and existing uses were evaluated).

One of the impacts of this alteration was cessation of annual flooding of the San Joaquin River. This removed the natural source of flow of the sloughs and of water supply for the wetlands. This change occurred in the late 1940s and early 1950s with the completion of Friant Dam. The land uses of the watershed were altered as a result of the altered hydrology. Since these alterations, wetlands have been artificially maintained and there has been an increase irrigation of lands in the western portion of the watershed, which has resulted in the drainage problem.

These land use practices are responsible for the current hydrologic patterns in the watershed; thus, making it an effluent dependent hydrology. Without wetland drainage, operational spills, surface return flows and subsurface drainage, there would be essentially no flow in the sloughs. Thus, it is not practical to assign beneficial uses corresponding to a condition which no longer exists and which can not be restored. Only uses which correspond to the current hydrology (post-1975) are

of importance in setting a regulatory program for agricultural subsurface drainage. Based on the legal and regulatory constraints the Regional Board derived those identified uses.

The staff report proposes that the wetland channels should not be protected for contact recreation (i.e., swimming). ...However, several drownings are reported in the wetland channels every year suggesting that swimming does currently exist as a use. (USEPA, 7/14/95)

As was noted in the staff report, the wetland channels are not natural water bodies. These channels do not have features that are conducive for swimming. Existing features include frequent periods of dryness, hydraulic structures and steep banks, which make swimming hazardous. Use of the channels is discouraged by the water districts which own and operate the channels. Thus, it would be inappropriate for the Regional Board to identify body contact recreation as a use of these water bodies.

Should full body contact occur, the California and federal primary drinking water standards Maximum Contaminant Levels (MCL) for selenium is 50 $\mu\text{g/L}$. This concentration is well above the proposed water quality criteria for aquatic life and wetland protection (5 $\mu\text{g/L}$ and 2 $\mu\text{g/L}$, respectively), which have been identified for all of the wetland channels. Thus, in protecting for these beneficial uses, the protection of body contact recreation would also be protected.

We recommend that the Regional Board staff identify on a map the specific channels it does and does not intend to be included [as designated with WILD]. (USEPA, 1/8/96)

The specific wetland water supply channels with a proposed WILD beneficial use are identified in Appendix 1 of the Basin Plan amendment March 1996 staff report.

...the staff report does not fully contemplate the association of Mud Slough with Kesterson National Wildlife Refuge and the potential for overflows from Mud Slough (i.e., stormwater flows). (USEPA, 7/4/95)

Environmental documents prepared in connection with the use of a portion of the San Luis Drain as a wetland bypass, concluded that maximum discharges to Mud Slough (north) are well within historic flows in Mud Slough (north) and no significant increase in flooding or impacts due to flooding, within Mud Slough (north) are anticipated (USBR, 1995).

Watershed Approach

Even if perceived as a benefit to the watershed as a whole, the quality of one waterbody cannot be traded for the quality of another waterbody through the beneficial use setting process. (USEPA, 7/14/95)

The beneficial use analysis has been conducted without regard to the water quality that may result from implementation of control measures. The Regional Board has strictly followed Federal and State provisions in its water quality planning in the Grassland watershed, including State Water Resources Control Board antidegradation policies. The Regional Board has analyzed each water body and identified all appropriate beneficial uses. This analysis has been conducted without regard to the water quality that may result from any implementation program. Rather, uses have been identified based on an evaluation of the past, present, and potential uses. Additionally, the Regional Board is adopting water quality objectives that protect the identified beneficial uses and an implementation program to insure compliance.

Summarized: The watershed approach to beneficial use designation is appropriate for the Grassland watershed because the hydrology of the area is governed by land use practices. Additionally, the conventional procedures used for designating beneficial uses are not appropriate because the channels are either effluent dominated, ephemeral, or constructed and governed by the land use practices which can change over time. Thus, the proposed beneficial uses may not be consistent with appropriate uses in the watershed (SLDMWA, 7/4/95).

At present, the watershed approach is limited to the implementation phase, in which priorities are ranked and schedules are developed for addressing the various priorities. There are presently no recognized procedures for designating beneficial uses on a watershed basis.

The Regional Board recognizes the short-comings with the present procedures for water quality control; namely, that present procedures do not recognize limitations of constructed and effluent dominated channels and ephemeral streams. However, the water quality control process is governed by existing statutes and regulations. These statutes require evaluating each water body on an individual basis. The Regional Board recognized, to the extent allowable, the limitations of Grassland watershed water bodies. For example, the limited designations of some uses, such as limited warm freshwater aquatic life.

We recommend that the Regional Board staff consider re-delineating the watershed boundary to include the Panoche-Silver Creek upslope areas and to more formally engage all watershed stakeholders in the development and implementation of a selenium control strategy. (USEPA, 1/8/96)

The current delineation of the San Joaquin River Basin contained in the Sacramento/San Joaquin River Basin Plan does not include the Panoche-Silver Creek watershed. The Sacramento/San Joaquin Basin Plan and the Tulare Lake Basin Plan are distinct documents. Modification of the southern boundary of the San Joaquin River Basin description would require concurrent modification of the Tulare Lake Basin description. Such modifications would be most appropriately addressed during the next triennial review of the respective Basin Plans. The Grassland watershed currently delineated is a hydrologically managed portion of the San Joaquin Valley floor. Regional Board staff does feel it is appropriate to include stakeholders in the Panoche-Silver Creek areas in the selenium control strategies and will continue to support the efforts of the Panoche-Silver Creek Coordinated Resources Management Program. In the Basin Plan amendment under "Actions Recommended for Implementation by Other Agencies: State Water Board", the Panoche Creek Watershed is recognized as a priority area to receive available USEPA nonpoint source funding.

Public Health Risks

The staff report does not present the public health risks associated with subsistence fishing, egg gathering, and other foraging in and around the Grasslands watershed area. ...To ensure environmental justice, the Basin Plan Amendment must provide a mechanism for protecting this current use. (USEPA, 7/14/95)

The Regional Board does not have a beneficial use designation for subsistence fishing and gathering. However, there is a designation for commercial and sports fishing and shellfish harvesting, which were identified for Mud Slough (north) and Salt Slough. These identified uses protect all types of gathering which may occur. At this time, a water quality objective which specifically protects subsistence gathering is not available, although, water quality objectives to protect fish and wildlife from excess selenium exposure are included in the amendment.

The Regional Board's role is to regulate water quality through protection of beneficial uses. The restriction of fishing and gathering activities is an interference with a beneficial use and consequently a concern of the Regional Board. However, the establishment of maximum contaminant levels in fish lies with public health agencies. In California, it is the responsibility of the Department of Health Services (DHS) to protect public health including fish consumption. DHS is currently revising its advisory levels for selenium in fish (Dr. Anna Fan, DHS, personal communications). Previous advisories for the Grassland area were based on threshold intake rates of 210 μg selenium per day per adult. Threshold intake rates for selenium have been revised by the USEPA to 700 μg /per day. DHS will be analyzing subsistence groups, gathering and consumption habits and levels of selenium in fish to determine risk and appropriate advisory levels (Dr. Anna Fan, DHS, personal communications.).

The prohibitions in this basin plan amendment will, in the short-term, result in the consolidation of selenium contaminated drainage. This consolidation of subsurface drainage will remove drainage from approximately 90 miles of channels and thus, produce an immediate improvement in water quality in these channels accessible to the public. The long term implementation program will reduce selenium levels in the remaining channels. It is the intent of the Regional Board to restore the water quality of Grassland watershed water bodies for the benefit of all of California's citizens.

WATER QUALITY OBJECTIVES

Extensive comments were received with respect to the water quality criteria that will be considered by staff in developing a selenium water quality objective for aquatic and wildlife protection. Comments were basically divided into two camps. Both camps were in agreement that the USEPA criteria was outdated or flawed.

One camp focused on the need to consider sulfate concentrations in developing an objective. They felt that the criteria presented in the staff report, including the USEPA's, did not consider the unique conditions of the San Joaquin River system of elevated sulfate concentrations which they claim reduces selenium bioaccumulation and bioconcentration. They argued for an objective greater than the USEPA's 5 $\mu\text{g}/\text{L}$. (SLDMWA, 12/11/95)

The other camp argued for an objective lower than the USEPA criteria. This recommendation was based on the recent scientific literature which was cited in the staff report and which pointed to a lower value (US Fish and Wildlife Service, and The Bay Institute, Environmental Defense Fund, and National Resources Defense Council). Field and laboratory studies were cited against the use of sulfate as an ameliorative agent to selenium toxicity.

Comments received on Water Quality Objectives are presented by topic below.

Narrative Objectives

We recommend that both the narrative and numeric water quality objectives be adopted to apply to the entire delineated San Joaquin River watershed area, including the wetland channels, Mud Slough, Salt Slough, and the San Joaquin River including that portion of the river from the Mendota Pool to Sack Dam. (USEPA, 1/8/96)

Table 1 of the August 1995 staff report, presents information on narrative water quality objectives that currently apply to all surface water bodies within the Central Valley Region, including Mud Slough (north), Salt Slough, and the San Joaquin River. No new narrative objectives were proposed. Existing narrative objectives apply to all waterbodies in the State. The revised format

for the March 1996 staff report should clarify all additions to and deletions from the existing Basin Plan.

Potential Influence of Sulfate Concentrations

Summary: Scientific literature citations supporting both opinions with respect to sulfate were provided. The SLDMWA cited several laboratory studies in which organisms of the lower levels of the food chain accumulated less selenium in elevated sulfate backgrounds. The US Fish and Wildlife Service (USFWS) acknowledge that sulfate can have a protective effect on selenite toxicity; however, they point out that dietary uptake is primarily through organoselenium compounds.

The interaction of sulfate with selenium has not been clearly resolved. In fact some studies (Bikner as cited in SWRCB, 1987³) claim that there is no relationship between dissolved sulfate and selenium bioaccumulation by a variety of taxonomic groups. Additionally, studies are cited (Rudd et al.³) which claim that sulfate bioaccumulation may be enhanced by increased sulfate concentration. And yet another study is cited in which there is no competitive interactions between sulfur and selenite³.

The USFWS, in response to the June 1995 workshop presentation by the SLDMWA, cited recently published service data for Mud Slough (north) and Salt Slough which shows selenium toxic levels in a small percentage of the fish and invertebrate sampled (2 to 15%) and a large percentage of the samples containing selenium concentrations within the level of concern (4-12 mg/Kg dry weight for fish, and 3-8 mg/Kg invertebrates). This finding indicates that the high levels of sulfate in these waters does not prevent the accumulation of selenium in these organisms. There appears to be considerable conflict with respect to the role of sulfate in the accumulation of selenium. The accumulation of selenium is influenced by a number of factors including the chemical species of selenium, the concentration, the organisms and life stage, length of exposure, and possibly water chemistry. These issues need to be resolved by the scientific community before sulfate can be considered in the assessment of an aquatic life objective for selenium.

Background Concentrations

Appropriate selenium water quality objectives for a region must take into consideration natural background levels of selenium in the region, and natural background levels of selenium frequently exceed USEPA's 5 ppb NWQC in ephemeral streams draining into the west side of the San Joaquin Valley. (SLDMWA, 7/4/95)

Section 13241 of the Porter-Cologne Water Quality Control Act instructs the Regional Board to establish water quality objectives *that in its judgment will ensure the reasonable protection of beneficial uses and the prevention of nuisance.* Among the factors the Regional Board is to consider is the *environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto, and water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area.* The elevated levels of selenium in the Grassland area water bodies, under consideration in the Basin Plan Amendment, primarily result from discharge of subsurface drainage and are not natural background. An evaluation of the Regional Board's water quality

³ State Water Resources Control Board, 1987. Regulation of Agricultural Drainage to the San Joaquin River. Appendix D, page 20.

data indicates that exceedances of water quality objectives correlate well with irrigation events and poorly with flow from ephemeral streams. The subsurface discharge is a controllable factor that must be considered in designating beneficial uses and water quality objectives.

... the level of selenium concentrations in the lower San Joaquin River are near or at natural background levels. These data need to be specifically addressed in the final staff report. (Broadview Water District, 12/8/95)

The majority of flow in the lower San Joaquin River comes from the upper San Joaquin River (during wet years), and three eastside tributaries: the Merced River, the Tuolumne River, and the Stanislaus River. Median selenium concentration in the San Joaquin River at Lander Avenue (upstream of the subsurface drainage discharges) was 0.5 $\mu\text{g/L}$ during water year 1994. Median concentrations from the eastside tributaries were all below 0.5 $\mu\text{g/L}$. During the same water year, the median concentration of selenium in the San Joaquin River at Hills Ferry, Crows Landing, and Vernalis (progressively downstream of the agricultural subsurface discharges) were 13 $\mu\text{g/L}$, 6.1 $\mu\text{g/L}$, and 2.6 $\mu\text{g/L}$, respectively. The concentration of selenium in the lower San Joaquin River is higher than natural background.

...unnatural background levels ... may affect primary and secondary wetland supply channels to the extent that these waters, in the absence of discharged drainage loads, could exceed 2 ppb selenium. (Porgans, 10/3/95: Page 4, Paragraph 5)

There are times when drainage water is not present in many primary and secondary wetland channels. Sampling by Regional Board staff during those times indicates that the 2 $\mu\text{g/L}$ objective is met. Should the 2 $\mu\text{g/L}$ selenium objective be exceeded in the wetland supply channels after subsurface drainage is removed, the Regional Board will have to address the issue of noncompliance and determine both the source of the selenium (alternate discharge or background concentrations) as well as the appropriate action.

U.S. EPA's Selenium Criteria

EPA's selenium criteria has been and continues to be implementable and enforceable by the Board. (Bay Institute, 10/2/95: Page 3, Paragraph 5)

The Porter-Cologne Water Quality Control Act (Water Code Section 13241) requires consideration of economics (among other factors) in development of water quality objectives. The development of U.S. EPA standards does not require consideration of economics. The promulgated federal criteria is enforceable on NPDES permitted discharges but there is confusion on how to apply the numbers to agriculture since Federal law does not provide provisions for implementing standards on non-point sources. Adoption of water quality objectives by the State will insure that they are "implementable and enforceable" for the regulation of nonpoint source discharges.

Appropriate Selenium Objective

We also recommend that the 2 ppb selenium standard for Salt Slough and the Grasslands channels be adopted for the basin as a whole... (Bay Institute, 10/2/95: Page 3, Paragraph 5)

The 2 ppb should apply to all waterways and channels of the Grasslands and the San Joaquin River. (Smith, 10/4/95: Page 3, Paragraph 5)

Criteria for Salt Slough and associated channels should be 2 µg/l to fully protect the use of this water for wetlands. Criteria for Mud Slough should be 5 µg/l at all times to protect the freshwater aquatic resources. A phase-in period will likely be needed pending completion of the drain to the confluence of the Merced and San Joaquin. Criteria for both segments of the San Joaquin River should be no greater than 5 µg/l at all times to protect the aquatic resources. (USFWS: Medlin, 7/12/96)

Summary: A concern was expressed that the USEPA criteria is not sufficient to protect beneficial uses in Grassland watershed water bodies and that recent scientific literature pointed to a more conservative criteria of about 2 µg/L. (US Fish and Wildlife Service, 7/12/95 and The Bay Institute, Environmental Defense Fund, and National Resources Defense Council; 7/6/95)

Because of selenium's bioaccumulative properties, the Board should adopt concentration-based standards below the 2 to 5 ppb threshold for adverse impacts to fish and wildlife species, and only in combination with mass emission reduction strategies which do not rely primarily on dilution benefits from the presumed assimilative capacity of receiving water bodies. (Bay Institute, EDF, and NRDC, 12/7/95)

Selenium concentrations should be determined on a total recoverable basis rather than dissolved as total selenium concentration correlate best to impacts observed in fish and wildlife. (USFWS: Medlin, 7/12/95)

The current Basin Plan amendment adopts 2 µg/L selenium as a monthly mean water quality objective in Salt Slough and all the wetland supply channels identified in Appendix 1. The amendment also adopts a 5 µg/L 4-day average selenium objective for Mud Slough (north) and the San Joaquin River. All water quality objectives are for total recoverable selenium. The 5 µg/L 4-day average objective is consistent with U.S. EPA's selenium criteria (USEPA, 1987) while the 2 µg/L monthly mean objective is based on the work of the U.S. FWS with waterfowl (Lemly and Smith, 1987 and Skorupa and Ohlendorf, 1991). All objectives have been reviewed by the U.S. EPA and U.S. FWS and have been found to be appropriate for these water bodies (Consensus, 1995).

We recommend that the Regional Board staff provide greater scientific justification for the different maximum selenium concentrations proposed for the San Joaquin River and the lack of a 4-day average or maximum in Salt Slough and the wetland channels. (USEPA, 1/8/96)

All selenium water quality objectives, except Salt Slough, have either been approved by the U.S. EPA or promulgated by the U.S. EPA. The 2 µg/L monthly mean for Salt Slough is based on protection of Salt Slough as a wetland water supply. A wetland water supply objective of 2 µg/L as a monthly mean was previously approved by the U.S. EPA. A maximum selenium concentration of 20 µg/L for Salt Slough and the wetland channels is also included in the amendment. This maximum value is the criteria promulgated by USEPA for the protection of Aquatic life.

Site-specific water quality objectives above 5 ppb in the San Joaquin Valley are appropriate, because harmful effects of selenium at levels currently found in these water have not been identified. (SLDMWA, 7/4/95)

... recent findings demonstrate that the 5 ppb selenium standard is inappropriate for the waters in the San Joaquin Valley and the standard should be increased to a higher number which is representative of the area. (SJR Exchange Contractors, 10/2/95: Page 3, Paragraph 1)

Recent reports of the Selenium Verification Study⁴ have been reviewed by the Regional Board. Data reviewed to date, demonstrates that impacts have resulted from the current exposures to selenium in the Grassland watershed. Although preliminary biological guidelines have been developed, biological standards are not presently available. The U.S. FWS has developed guidelines based on field observations of selenium body burdens and physiological response. Three concentration ranges were recognized corresponding to a level of response; no effect, levels of concern and toxic levels. In reviewing fish tissue body burdens⁴ of fish in the Grassland watershed, it was noted that some values exceeded the toxicity threshold guidelines of 12 mg/Kg dry weight for fish. Additionally, many of the sample results were in the upper range of the level of concern (e.g. greater than 8 mg/kg). The level of concern is between 4 and 12 mg/Kg. This observation is consistent with comments and data submitted by the U.S. FWS in which they cite recent service data. This observation, however, does not negate the potential for site specific objective development.

We recommend that the Regional Board staff propose language which make clear that the 5 ppb selenium objective will go into effect immediately upon adoption of the plan. (USEPA, 1/8/96)

All site specific water quality objectives go into effect immediately upon adoption of the Basin Plan Amendment. The implementation program sets the limits on the time schedule for compliance with the objectives.

The Water Authority requests that the Regional Board include a Re-Opener Clause in the Basin Plan Amendment, to review the appropriateness of the EPA criterion, before it is implemented. (SLDMWA cover letter, 12/11/95)

We request that the Regional Board, as part of its Basin Planning Process, implement a formal procedure to develop a site-specific selenium concentration objective for the San Joaquin River and Mud Slough. (SLDMWA, 12/11/95)

The Basin Plan Amendment results in the immediate adoption of the U.S. EPA chronic water quality standard for selenium for the protection of aquatic life. The implementation program for the water quality objective allows up to 10-15 years, depending on location and water year type before requiring compliance. During that period of time, site specific selenium criteria could be developed. The Basin Plan Amendment language states that the Regional Board staff will coordinate with the U.S. EPA and dischargers on a study plan to support the development of site specific water quality objectives. Before such criteria were adopted as water quality objectives and implemented, the Basin Plan would again have to be amended.

Load vs. Concentration Based Objectives

The Total Maximum Concentration Load of an ecosystem ignores the synergistic effects of the various chemical components that are already in or that are being added on a daily bases. (Smith, 10/4/95: Page 6, Paragraph 2)

We are also skeptical of using selenium load control as a surrogate for achieving the required selenium concentrations in the river.... measures to reduce the discharged load of either

⁴ Selenium Monitoring and Evaluation Program 1991. California Department of Fish and Game. December 1994.

selenium or salt may actually increase their concentration in the river. (South Delta Water Agency: Hildebrand, 9/12/95: Page 1, Paragraph 2)

No studies that indicate synergism between selenium and other chemical compounds were available for review. In addition, it is unclear how reduction of pollutant loads would result in an increase in receiving water concentration. The Basin Plan amendment adopts a prohibition of discharge of greater than 8,000 pounds/year to the San Joaquin River. This concentration is based on the maximum selenium load which annually entered the river between 1986 and 1994. Additional load restrictions are to be incorporated into Waste Discharge Requirements to ultimately meet final water quality objective of 5 $\mu\text{g/L}$ on a 4-day average. The selenium loads are based on the assimilative capacity of the San Joaquin River. The prohibition insures that selenium load will not exceed historic levels. Unless the current discharge is contributing to the assimilative capacity of the river, concentrations in the river should decrease.

Biologically Based Objectives

In addition to the water quality and loading objectives the Service recommends setting numeric and/or narrative objectives for the San Joaquin River, Mud Slough, and Salt Slough that utilize mean selenium concentrations in fish (whole body) and food chain organisms (invertebrates) based on the ecological risk guidelines proposed by the San Luis Drain Re-use Technical Advisory Committee. (USFWS: Medlin, 10/4/95: Page 3, Paragraph 2)

Dietary intake of Selenium is the most sensitive exposure pathway to fish and wildlife, thus true assessment of selenium risks to fish and wildlife are best determined by dietary levels rather than water concentrations. (USFWS: Medlin, 7/12/95)

The development of biological criteria for selenium is appropriate. A biological criteria could be used in conjunction with water quality objectives to monitor compliance and impacts to wildlife. At this time, a biological criteria is not being adopted because the database to support such a criteria is still being developed. Presently, the U.S. FWS has proposed guidelines for interpretation of selenium burdens in various food chain elements. These guidelines have been used in interpreting biological data collected in the Grassland watershed and will likely be used in the future in connection with data gathered in monitoring compliance with the Basin Plan Amendment. The Regional Board may also use these guidelines to assess compliance with the narrative toxicity objective for all surface waters. A biological criteria could be used to develop a site specific criteria for selenium, if selenium body burden data correlates well with water quality data.

Another issue that prevents the adoption of a biological selenium objective is the inability to consider economics costs associated with such an objective. The Regional Board is required to consider economics (among other factors) in developing an objective (Porter-Cologne Water Quality Control Act, § 13241). With a selenium water quality objective, it is possible to make cost estimates of the control actions necessary to meet the objective. It is unclear how to evaluate economics with a biological objective.

IMPLEMENTATION

In developing control actions for the Grassland watershed, the Regional Board recognizes that full attainment of beneficial use will not be possible for a considerable period of time. In developing the control actions for selenium, the Regional Board utilizes a priority system which focuses on a

combination of sensitivity of the beneficial use to selenium and the amount of environmental benefit expected from the action. The most sensitive beneficial uses, those uses which are potentially impacted by selenium at a lower concentration, will be given first priority for protection. This is not intended to downplay the importance of any specific beneficial use, rather it is to focus resources on those actions expected to give the highest level of beneficial use improvement. Environmental benefit expected is measured in terms of miles and/or acres of surface water that will no longer be impacted.

The goals for beneficial use protection were developed from evidence presented by all participating groups during the three workshops held by the Regional Board on the Basin Plan Amendment. The following goals for protecting beneficial uses in the Grassland watershed and San Joaquin River are listed in order of priority. This priority list has been used to develop the control actions and timetable in the proposed amendment.

- 1) Attainment of the wildlife beneficial use to ensure protection of the wetlands within the Grassland watershed. Waterfowl and other aquatic organisms within a wetland environment are very sensitive to selenium and other toxic elements. Removal of selenium from this environment will enhance the full attainment of the wetland component of the wildlife beneficial use in the managed water channels used for a wetland environment.
- 2) Attainment of the aquatic life beneficial use in all channels used for wetland water supply within the Grassland watershed. A diversity of aquatic life in wetland supply channels will enhance the multiple use of these channels and enhance the diversity of aquatic life finding their way into the wetlands.
- 3) Attainment of the aquatic life beneficial use in the San Joaquin River downstream of the Merced River inflow. The San Joaquin River downstream of the Merced River is a natural flowing stream with a diversity of beneficial uses that must be protected. These beneficial uses are also critical to beneficial use attainment in the Delta. Aquatic life beneficial uses are sensitive to the selenium that is discharged with the agricultural subsurface drainage.
- 4) Attainment of the appropriate aquatic life beneficial use in the effluent-dominated natural channels of the Grassland watershed and full aquatic life protection in the San Joaquin River upstream of the Merced River inflow.

POLICY

Policy b. Activities that increase the discharge of poor quality agricultural subsurface drainage are prohibited will be discouraged through the adoption of prohibitions of discharge and other control measures. (Existing - Revised)

1. *You are proposing to revise Policy b in Table 6 (p. 18) to discourage rather than prohibit activities that increase the discharge of poor quality drainage water. This seems inconsistent with the discussion of this policy... (SWRCB: DWQ, 10/6/95: Page 1, Paragraph 2)*

The Service feels the statement "are prohibited" should remain and it's definition expanded beyond installation of new subsurface drainage facilities. (USFWS: Medlin, 10/4/95: Page 3, Paragraph 7)

We do not support changing the words "are prohibited" to "will be discouraged" in this policy. (Bay Institute, 10/2/95: Page 4, Paragraph 1)

What are the activities that increase the discharge of poor quality agricultural subsurface drainage? (Broadview Water District, 9/26/95: Page 3, Paragraph 3)

... the City respectively request[s] that the Board modify its proposed program to allow the discharge of subsurface drainage from wastewater reclamation projects in the Gustine area. (City of Gustine, 12/6/95)

The revised language was done to clarify the policy intent (See discussion of policy (b) in the staff report (CVRWQCB, 1996a)). The original prohibition adopted in 1988, referred specifically to the installation of new tile or open drainage systems (CVRWQCB, 1988). Since the original policy was not clear and was narrowly focused, it was reworded here to expand the intent of the policy. This policy can then be used to establish a series of prohibitions or other actions that allow for implementation. At this time, a prohibition has been proposed on the installation of new subsurface drainage systems which negatively impact water quality (See prohibition section of the Basin Plan). The specific prohibitions that are proposed clarify which activities are being targeted (such as the installation of new subsurface drainage systems without waste discharge requirements) and the area of concern (the Grassland watershed and San Joaquin River). Other prohibitions can also be proposed based on the new policy.

The anti-backsliding provisions of the Clean Water Act apply to effluent limitations in NPDES permits (CWA Section 403(o)), and not to policies in the Basin Plan. In any event, as explained above, this policy is not less stringent than the existing policy.

Policy e. ~~Of the two major options for disposal of salts produced by agricultural irrigation; export out of the basin of accumulated salts due to agricultural irrigation and wetlands management has less potential for environmental impacts and, therefore, is the favored disposal option. The San Joaquin River may continue to be used to remove these salts from the basin so long as water quality objectives are met. (Existing - Revised)~~

Any linkage between out-of-basin export and protection of beneficial uses of the San Joaquin River must be rejected. Since beneficial uses of the River are impaired by selenium accumulation even when water quality objectives are met . . . , the total load of selenium that is discharged to the River should be reduced to safe levels regardless of the ultimate resolution of the valley's salt disposal problem. This policy should be deleted for this reason . . . (Bay Institute, 10/2/95: Page 4, Paragraph 2)

Salt management continues to be a key issue in the San Joaquin River Basin. The intent of this policy as described in the discussion of Policy (e) in the staff report (CVRWQCB, 1996) was to discourage the storage of salt in the Basin until it could be demonstrated that future water quality would be protected and that the economic base in the Basin could be maintained. It is not the intent of this policy to say that the San Joaquin River can continue to be used as a "substitute" drain. The policy specifically states that water quality objectives must be met and beneficial uses protected. The most immediate concern is for the elevated selenium levels in the River. Effluent limits based on selenium loads is a key component of the implementation program in the Basin

Plan Amendment. A prohibition of selenium loads in excess of 8,000 lbs/year is also included to prevent degradation above historical levels. Selenium loads will be reduced over the term of the compliance schedule by incorporating load limits as effluent limits in Waste Discharge Requirements for the discharge of agricultural subsurface drainage from the Grassland watershed.

Prohibitions and waste discharge requirements have not been used previously to control agricultural subsurface drainage. It is the position of the Regional Board that use of these regulatory enforcement mechanisms will result in compliance with water quality objectives.

Policy f. The A valley-wide drain to carry the salts generated by agricultural irrigation out of the valley remains the best technical solution to the water quality problems of the San Joaquin River and Tulare Lake Basins. The drain would carry wastewater high in salt and unfit for reuse that is generated by municipal, industrial, agricultural and wetland management activities.

The Regional Board, at this time, feels that a valley-wide drain will be the only feasible, long-range solution for achieving a salt balance in the Central Valley. The Regional Board favors the construction of a valley-wide drain under the following conditions:

All toxicants would be reduced to a level which would not harm beneficial uses of receiving waters;

The discharge would be governed by specific discharge and receiving water limits in an NPDES permit; and

Long-term, continuous biological monitoring would be required. (Existing - Revised)

*... the report needs to acknowledge that a drain needs to be built to achieve salt balance... (William Johnston, South Delta Water Agency, comments at 23 June 1995 workshop)
This policy should be deleted as unnecessary. . . Not only is a valley wide drain unnecessary, it is premised on the export of drainage-related water quality problems to other, perhaps more critical environments. (Bay Institute, 10/2/95: Page 4, Paragraph 4)*

Comment summary: The Board should refrain from promoting a valley-wide Drain as the ultimate solution to this problem. Reliance should not be placed on a future "magic bullet" to solve problems caused by toxic trace elements in drainage. (EDF, 10/4/95: Page 2, Paragraph 2)

The proposal to build a valley-wide drain....is unacceptable. It is a totally unreasonable solution to propose ... to export the toxic problems to other environmentally sensitive areas. (Patagonia, 10/4/95)

Contra Costa County fundamentally opposes construction of an isolated drain to the Delta.... (Contra Costa County, 10/4/95: Page 1, Paragraph 3)

... the Service suggests the Regional Board delete all referenced changes to the Basin Plan regarding the VWD [Valley Wide Drain] and concentrate on the Grasslands issues at hand. (USFWS: Medlin, 10/4/95: Page 2, Paragraph 4)

The District strongly opposes the concept of exporting drainage problems from their source to another location. ... especially when the receiving water is the already environmentally sensitive Delta. (Contra Costa Water District, 10/4/95: Page 2, Paragraph 3)
We do not need toxics shipped into the Delta from other areas compounding our water problems. (Ambach, 12/5/95)

We recommend that the Regional Board not adopt these amendments [policies e and f] but reserve them for consideration in their salinity amendment. (USEPA, 1/8/96)

The addition of language regarding "wastewater high in salt and unfit for reuse" is a minor revision to the existing language in order to make this policy consistent with language adopted into the Tulare Lake Basin Plan. Existing Regional Board policies already promote a valley-wide drain as a solution to the salt management problems in the Central Valley, not as a toxic trace element management solution. The revision does not change existing policy. Although in-valley options may provide adequate management of salts for fifty years, the SJVDP's 1990 Management Plan recognized that the removal of accumulated salt from the basin was essential for long term agricultural and wetland sustainability.

The Regional Board policy statement does not suggest an outfall for the drainage. Such a determination must be done through more detailed studies. The Board continues to feel that the three criteria listed in this policy must be met. Of particular concern is the toxicants. If the toxicants in the drainage could not be reduced to a level that would not impair beneficial uses in the receiving water, the Regional Board would oppose the outfall location.

Policy g. Optimizing protection of beneficial uses on a watershed basis will guide the development of actions to regulate agricultural subsurface drainage discharges. (New)

Policy G "allows for short term degradation of individual water bodies, if the overall watershed is enhanced. ..." this policy appears to generally violate the federal Clean Water Act's anti-degradation requirements. ... Even if it were legal under federal law, a policy allowing short-term degradation could only be justified by accompanying requirements that degradation will be reversed in a timely and vigorous manner. (Bay Institute, 10/2/95: Page 4, Paragraph 5)

We recommend that the Regional Board adopt language which ensures that its implementation plan protects against irreversible harm and significant environmental impacts anywhere in the watershed and ensures full compliance with water quality objectives in the long term. (USEPA, 1/8/96)

Beneficial uses have been identified for water bodies within the Grassland watershed without consideration to potential control actions, but rather considering only past, present, and potential uses of the water body. Subsequently, water quality objectives were developed that consider protection of the identified beneficial uses. Thus, it is the goal of this basin plan amendment to develop control actions that will result in the attainment of water quality objectives and protection of beneficial uses for all water bodies being considered under this action.

The watershed approach involves ranking of water quality issues according to priority and implementing control actions based on those priorities. In formulating a watershed approach strategy for addressing the selenium drainage problem in the Grassland watershed, the Regional Board has developed control actions that will focus on a combination of sensitivity of the beneficial use to selenium and on the expected environmental benefit from the action.

The Grassland watershed has a managed hydrologic regime. It follows then that beneficial uses, at the watershed level, can be maximized through alteration in the present water management practices. An example is the consolidation of drainage into fewer channels versus the current practice of distributing it to numerous wetland channels. This consolidation will result in immediate improvement in the water quality and level of beneficial use attainment in most channels. However, some channels will continue to exceed water quality objectives until, by other control actions, compliance with water quality objectives can be achieved. The continued discharge of drainage is not expected to cause irreversible damage to these water bodies since these water bodies have been receiving drainage for over 45 years. The basin plan amendment outlines the regulatory program which will be used to achieve compliance with water quality objectives in all water bodies under consideration.

Since control actions are implemented on a priority basis, control actions will be phased in and attainment of water quality objectives will not be immediately realized in all water bodies simultaneously. However, it is the intent of this basin plan amendment that water quality objectives will be attained in all water bodies identified in this basin plan amendment by the compliance date.

PROHIBITIONS

Prohibition of Discharge

The Board should also prohibit discharge to the Grassland watershed... (Bay Institute, 10/2/95: Page 3, Paragraph 4)

A discharge prohibition was considered, but was determined to be the most costly regulatory alternative as well as inconsistent with the State Water Board's Nonpoint Source Management Policy which recommends the use of the least stringent regulatory mechanism that is likely to result in compliance with objectives.

Load Caps

Se loading to the San Joaquin River via Mud Slough and Salt Slough should not exceed 8,000 pounds per year, with phased reductions highly desirable. (USFWS: Medlin, 7/12/95)

The prohibition of selenium discharge from the Grassland watershed in excess of the average annual historical maximum will not prevent further degradation of beneficial uses, ... (Bay Institute, 10/2/95: Page 6, Paragraph 4)

Comment summary: The 8,000 lbs/year limit for selenium should be adjusted to the 7,096 lbs/year limit to which the draining parties have agreed. (Contra Costa County, 10/4/95: Page 2, Paragraph 3)

We recommend that the Regional Board staff revise its proposed maximum load limit to be 6,600 lbs. of selenium annually. Further, we recommend that the Regional Board staff revise its implementation date to be immediately upon adoption of the plan. (USEPA, 1/8/96)

The draft agreement for the interim use of the San Luis Drain has a load cap of 6,660 lbs/year in the first two years. This maximum number proposed in the consensus letter (Consensus, 1995) of 6,600 lbs, triggers potential fines if exceeded. The sanction of prohibition of the use of the

Grassland Bypass only occurs if that maximum cap is exceeded by greater than 20% (i.e. approximately 8,000 lbs/year). The maximum selenium load limit of 8,000 lbs expressed in the prohibition to discharge is consistent with the draft agreement. This maximum load cap will go into effect on 1 October 1996 and will be evaluated on a water year basis (1 October through 30 September). A load cap will prevent further degradation of water quality. The absence of a load cap could result in degradation.

The monthly waste load allocations contained in Table 5A (Dry Year) and Table 5B (Wet Year) should be adopted as part of its amendments to the Basin Plan by the Board as enforceable selenium load caps under the Table 3(8)e prohibitions [from the November 1995 staff report]. (Bay Institute, EDF, and NRDC; 12/7/95)

The staff report does include a draft TMDL for selenium in the San Joaquin River below the Merced River inflow. The TMDL methodology will not be used in the first five years of the regulatory program as a consensus proposal from the U. S. Fish and Wildlife Service, the U. S. Bureau of Reclamation, the U. S. Environmental Protection Agency and the San Luis & Delta Mendota Water Authority specified load limitations (Consensus, 1995) and the Regional Board found these adequate for the initial period.

The draft TMDL is preliminary at this time and is considered the first phase of developing a methodology on how to define the extent of load reductions that may be necessary to meet future water quality objectives. This TMDL will not be incorporated into the Basin Plan at this time. If a TMDL forms the basis for the regulatory program after the initial five year consensus approach, the draft TMDL will be updated, as needed, and will go through a full public review process prior to submittal to U.S. EPA. The wording of the Basin Plan Amendment has been modified to reflect this. The March 1996 staff report (CVRWQCB, 1996a) provides more detail regarding how the TMDL could be submitted to the U.S. EPA upon completion of the public review process.

The TMDL methodology uses the best available information and techniques to estimate load reductions that are needed to meet water quality objectives. Load limitations will be used as one of the factors for establishing effluent limits in waste discharge requirements. These effluent limits may need to be consistent with Clean Water Act requirements for implementation of a TMDL. It is unclear whether a formal TMDL is required for a non-NPDES discharge from irrigated agriculture. By not adopting the TMDL into the Basin Plan at this time allows flexibility in how technology is developed and applied to nonpoint sources.

As stated in the staff report, selenium load limits will not be used to meet objectives in Salt Slough, Mud Slough (north), the wetland supply channels, or the San Joaquin River above the Merced River. Rather, a prohibition of discharge will be the regulatory mechanism.

Waiver of Discharge Prohibition

We ... urge the Regional Board to remove the language providing for a waiver of the proposed 2 ppb selenium objective in the absence of the wetland bypass project. In its stead, we request that alternative implementation plans and compliance schedules be identified. (Grasslands Water District, 10/4/95)

The waiver for exceeding the 2 ppb standard in the Grasslands channels, should the grassland bypass not be implemented, is not supported by the Service. (USFWS: Medlin, 10/4/95: Page 5, Paragraph 10)

The second sentence [Prohibitions, item b] concerning the waiver should be deleted. (Bay Institute, 10/2/95: Page 6, Paragraph 3)

... the San Luis NWRC does not support the second sentence contained within Table 8 (PROHIBITIONS) item b. (USFWS: Zahm, 10/4/95: Page 2, Paragraph 4)

We believe that this prohibition is a terminal sanction which is inappropriate vis a vis water right holders with historic drainage rights unless such a sanction is tied to specific identification and control of those upslope entities which cause or add to drainage as contrasted with the downslope entities which, due to their location, are those which are the ultimate dischargers into the sloughs and river. (SJR Exchange Contractors, 10/2/95: Page 2, Paragraph 4)

The language in prohibition "b" has been reworded. The waiver language has been deleted; rather the Basin Plan amendment language states that the Board will reconsider the prohibition if the implementation of a separate drainage conveyance facility is prevented by public or private interests. Such reconsideration would require an amendment to the Basin Plan. Therefore, no alternative implementation plans or compliance schedules will be identified. If agricultural subsurface drainage is present in the designated wetland channels after the compliance date, the Regional Board will address the issue of non-compliance at that time.

CONTROL ACTIONS

Compliance

... the Basin Plan Amendment should more clearly acknowledge the presence and potential reuse of the San Luis Drain as an important and complex component of drainage management in the Grasslands area. (USEPA, 7/14/95)

The Regional Board considered the need to use a separate conveyance facility to meet objectives in the Grassland Watershed as is consistent with recommendation from the San Joaquin Valley Drainage Program Final Report (SJVDP, 1990). The feasibility of using the San Luis Drain as this conveyance facility was evaluated when determining whether prohibitions on subsurface agricultural discharges were technically achievable.

Specific numerical limits on selenium discharges need to be set by this Board. (Miller, 12/7/95)

There are now "goals" instead of "water quality objectives" and enforcement appears to be largely voluntary. (Patagonia, 12/5/95)

The [proposed] approach allows the dischargers to "design their own methods of compliance and to apportion this load among themselves." Past experience proves unequivocally that the drainers have failed to effectively provide adequate solutions to meet water quality requirements. (Porgans, 10/3/95: Page 4, Paragraph 2)

The amendment adopts selenium water quality objectives for the San Joaquin River, Mud Slough (north), Salt Slough, and wetland water supply channels. Prohibitions and Waste Discharge Requirements (WDRs) will be the enforcement mechanisms to ensure that the water quality objectives are met. Performance goals will be utilized to ensure continual improvements in water quality in line with the compliance time schedule and will direct the Board on how to frame the

WDRs. The WDRs will provide enforceable effluent limits. Porter-Cologne prohibits the Regional Board from specifying the manner of compliance with WDRs.

I believe the citizens of the Delta want zero selenium discharge even if that means no irrigated crops in the problem areas, and any solution other than zero discharge is unacceptable no matter how it is or is not monitored. (City of Antioch, 12/11/95)

A portion of the San Luis Drain is being used to consolidate existing subsurface agricultural discharge to the San Joaquin River. The Basin Plan amendment adopts a prohibition of discharge of greater than 8,000 pounds/year to the San Joaquin River. The prohibition insures that the loads will not exceed historic levels therefore water quality should not decrease in the San Joaquin River. Additional load restrictions are to be incorporated into Waste Discharge Requirements to ultimately meet a final water quality objectives of 5 µg/L on a 4-day average.

As detailed in the March 1996 staff report, a prohibition of discharge to the San Joaquin River was considered as a means of meeting water quality objectives. This alternative was not recommended since it is not consistent with existing state non-point source management policy. This policy requires the use of the least stringent regulatory mechanism that is likely to result in compliance. The Regional Board concluded that the imposition of effluent limits will result in compliance with selenium water quality objectives in the San Joaquin River below the Merced River.

The language of your Staff's comments on the last paragraph of page 17 and page 18 [of the November 1995 staff report] is totally unclear and makes it impossible to determine what action, if any, your Board intends to take should full compliance not be in place by the year 2010 in Mud Slough north and the San Joaquin River downstream of Mud Slough, north to the Merced River. (Patagonia, 12/5/95)

Allowing the continuation of discharges of agricultural drainage water to Mud Slough (north) without specific goals for improvement is unacceptable. (USFWS: Frazer, 12/12/95)

As stated in the November 1995 staff report, no improvements in water quality in Mud Slough (north) are expected until drainage water is removed. Development of interim goals for Mud Slough (north) does not appear appropriate. The Basin Plan amendment language does include a prohibition of discharge of agricultural subsurface drainage into Mud Slough (north) and the San Joaquin River upstream of the Merced River confluence if water quality objectives are not met by the compliance date.

If unquantified potential future increases in flow are given consideration [in the discussion of load caps contained in the prohibition section], should not equal consideration be given to the possibility that between now and the implementation date of 2005, the applicable standard may become 2 µg/L rather than 5 µg/L? (USFWS: Medlin, 12/7/95)

If the applicable water quality objective is changed, the Basin Plan would have to be amended to include both the revised water quality objective and an appropriate implementation program. The Regional Board will submit a TMDL to the U.S. EPA that reflects the current state of knowledge regarding allowable selenium loads in the San Joaquin River to meet performance goals and final water quality objectives [refer to "Proposed TMDL Submittal to the U.S. EPA" section of the March 1996 staff report]. The TMDL will be updated as more information becomes available.

Concentrations vs. Loads

The Exchange Contractors disagree with the notion of using "loads" as a basis which the RWQCB would use to meet the 5 ppb selenium standard at Crows Landing. (SJR Exchange Contractors, 10/2/95))

Implementation of concentration-based standards for selenium assumes an assimilative capacity in receiving waterbodies that overlooks selenium's bioaccumulative properties and relies on presumed dilution benefits. The Board should require that concentration-based water quality standards for selenium be met exclusively through reductions in mass loading, ... (Bay Institute, 10/2/95: Page 2, Paragraph 4)

As stated in the staff report, improvements in water quality in the San Joaquin River have only occurred in response to load reductions. Absent an effective alternative, load reductions will be used by the Regional Board to achieve water quality objectives.

Currently, the only available water quality criteria are based on concentration in the water column. There are no biological criteria approved by the U.S. EPA or the state; therefore, basing a regulatory program directly on selenium's bioaccumulative properties is not feasible at this time due to the lack of appropriate criteria. It should be noted that the Basin Plan amendment language puts a heavy emphasis on selenium load reductions.

We recommend that the Board adopt load caps as enforceable performance requirements, not selenium concentrations as performance goals, during the interim period leading to full compliance with water quality standards. (Bay Institute, EDF, and NRDC; 12/7/95)

The concentration based performance goals will guide the development of appropriate effluent limits for incorporation into waste discharge requirements and ultimate compliance with water quality objectives. The waste discharge requirements will be the enforcement mechanism to ensure compliance with the amendment's goals. Therefore, interim load limits are more appropriately incorporated into the WDRs.

Use of Assimilative Capacities

There are two ways to meet selenium load reduction targets: 1) reuse and 2) turning off tile sumps. These options will result in land eventually going out of production. The proposed targets do not allow use of assimilative capacity during high flows. (Broadview Water District, 9/26/95: Page 1, Paragraph 2; Page 2, Paragraph 6)

There are a number of options identified in the San Joaquin Valley Drainage Program Final report and by others that should lead to load reductions. Some could be implemented immediately (e.g. land retirement and irrigation improvements) and others need further development (ground water management, agroforestry, and treatment). The staff report recognizes the need to develop and implement new technologies. This recognition is reflected in the extended time schedule for compliance.

Data collected by Regional Board staff and others indicates that water quality in the San Joaquin River improves in response to selenium load reductions. Load targets will mean that there are times when there is "unused" assimilative capacity during high flows, but the load targets will ensure that water quality objectives are met during low flows. In order to use assimilative

capacity during high flows, there would have to be a demonstrated capability of not violating water quality objectives during low flows.

Using the assimilation capacity of receiving waters provides false security to the general public. . . . (Smith, 10/4/95: Page 6, Paragraph 4)

The selenium load allocations (TMDL) developed to meet water quality objectives are consistent with U.S. EPA guidance. Water quality objectives should not be violated at a rate greater than once every three years.

WDR Effluent Limits

We encourage the inclusion of static effluent load limits in WDRs as an action required in the basin plan to control the discharge of subsurface drainage. (Bay Institute, 10/2/95: Page 7, Paragraph 4)

. . . strongly recommend that these [effluent] limits be incorporated as enforceable effluent limits in a Waste Discharge Permit; . . . (EDF, 10/4/95: Page 2, Paragraph 1)

Effluent limits will be incorporated into WDRs to achieve water quality objectives. *The San Francisco Bay Regional Board is controlling selenium discharge from industry at great expense to industry, with substantial fines for violations. Why can't the Central Valley Board invoke the same standards for river discharge requirements with the same penalties for the farming industry? (City of Antioch, 12/11/95)*

It would not be appropriate to apply the same standards for river discharge as is applied to refineries in the San Francisco Bay/Delta Estuary. The receiving waters differ significantly and the sources of discharges differ significantly (point versus non-point sources of pollution). The Basin Plan Amendment proposes using a similar regulatory tool, waste discharge requirements which contain effluent limits to control the agricultural discharges. The maximum penalties for violations of waste discharge requirements are clearly established by state water quality law (Porter-Cologne Water Quality Control Act; Water Code Sections 13265 and 13350).

WDR Review Schedule

... we feel that 5 year review schedule for Waste Discharge Requirements ... is too long. We believe that a yearly review of the WDR would be more appropriate ... (Contra Costa County, 10/4/95: Page 3, Paragraph 1)

Action 10 - The Service feels that review by the Regional Board must be more frequent than 5 years and suggests a review period of 2 or 3 years. (USFWS: Medlin, 10/4/95: Page 4, Paragraph 10)

... we request that WDRs be open to review at any time... (USFWS: Medlin, 10/4/95)

The review period for the WDRs identified in the Basin Plan amendment is at a minimum of every five years. This review schedule is consistent with reviews for high priority discharge which are under WDRs. WDRs can be modified at any time. The Regional Board may review the requirements more frequently if it is warranted and sufficient funding is available. In addition, the proposed amendment requires annual review of the effectiveness of control actions. The annual review will be conducted by the dischargers and submitted to the Regional Board for evaluation.

... the implementation plan must make the penalties for exceeding the load reduction schedules in the Waste Discharge Requirements explicit. (Contra Costa County, 10/4/95: Page 3, Paragraph 2)

Porter-Cologne describes the administrative enforcement including penalties, that can be performed by the Regional Board. Generally, a cease and desist order would be issued for violation of waste discharge requirements. If the cease and desist order failed to bring about compliance, the Regional Board could take an administrative civil liability action. Fines up to \$5,000/day or \$15,000/day can be imposed by the Regional Board or superior court, respectively, for each day a cease and desist order is violated (Water Code § 13350).

Load Reductions

The Drainage Problem Area target ... should be reduced from 8,000 lbs/year to ... 5,000 lbs or less to reflect the need to meet Federal standards. (Contra Costa Water District, 10/4/95: Page 4, Paragraph 5)

As shown in Tables 10a and 10b of the March 1996 staff report, loads will need to be reduced to 3,000 lbs/year in wet years and 1,000 lbs/year in dry years to meet objectives in the San Joaquin River downstream of the Merced River. These numbers are 40% and 80% less than the suggested target. Adoption of a 5,000 lbs/year target would not result in compliance with objectives in the San Joaquin River.

It should also be noted that even a limit of 1,000 lbs/year would not result with compliance in Mud Slough (north) due to the lack of dilution flow, therefore, a prohibition of discharge has been incorporated into the long-term compliance schedule.

Statement h(8) [August 1995 staff report]. This statement can be improved by discussing the important fish and wildlife resource that will benefit from reduced loading to the San Joaquin river and Delta... (USFWS: Medlin, 10/4/95: Page 4, Paragraph 3)

Additional discussion reflecting benefits to fish and wildlife resources has been added.

Has this initial volume of selenium [from the San Luis Drain] been included in the proposed 15 percent farm reduction of selenium drainage to be disposed of annually? (City of Antioch, 12/11/95)

Compliance with the load [which is measured in mass units and not volume units] requirements in the Basin Plan or in waste discharge requirements would be measured at the point furthest downstream over which the agricultural districts control the discharge. If the San Luis Drain is used, the discharge would be measured at the terminus of the Drain - near Mud Slough (north). Compliance with the load limits is independent of the source. Any selenium mobilized from the Drain would count towards the total selenium load specified in the Basin Plan or waste discharge requirements.

Does anyone know the actual measured volume of selenium now being disposed of into the grassland so that we can actually determine a 15 percent reduction? (City of Antioch, 12/11/95)

The selenium discharges from the agricultural districts flow to Mud Slough (north) and Salt Slough, which are tributary to the San Joaquin River. The selenium load from the agricultural

districts and in the sloughs has been measured since 1986, so any reductions in selenium loading can be determined.

... the Board should require additional reductions in selenium loads through more stringent load caps at the close of the five year period of interim use of the San Luis Drain. (Bay Institute, EDF, and NRDC; 12/7/95)

The District also recommends that the Regional Board use selenium load limits rather than interim performance goals to drive performance toward meeting the concentration performance goals. (Contra Costa Water District, 12/7/95)

We recommend that the annual selenium load numbers in table 5C [of the November 1995 staff report],, be substituted for table 1B. (USFWS: Medlin, 12/7/95)

The Regional Board will submit a TMDL for selenium in the San Joaquin River as required by section 303(d) of the Federal Clean Water Act. The TMDL will be incorporated into waste discharge requirements to achieve water quality objectives. A discussion of the proposed TMDL and the draft letter to the U.S. EPA can be found in Part V and Appendix 6, respectively, of the March 1996 staff report. The TMML is not being incorporated directly as part of the Basin Plan. Rather information on the TMML has been included in the March 1996 staff report to facilitate public review of the effluent limits likely to be incorporated into future WDRs.

Regional Board staff apparently developed the schedule in Table 1A [of the November 1995 staff report] by extending the selenium load reductions in the Grassland Bypass Use Agreement beyond 1 October 2000. The District believes that the 15% reduction over [the] last three years of the Use Agreement is not sufficient, and the Regional Board should require a much higher rate of load reduction once the Field Experiment ends. (Contra Costa Water District, 12/7/95)

The development of the compliance time schedule is discussed in the evaluation of alternatives in both the November 1995 staff report and Part V of the March 1996 staff report. The schedule was based on an evaluation of the time required to develop and implement various selenium load reduction alternatives.

The 5% annual reductions in selenium load contained in the Consensus Letter should not be extended beyond the term of the Use Agreement, because further reductions would be inconsistent with efforts to utilize Real-Time Management to achieve selenium concentration objectives. (SLDMWA, 12/11/95)

As discussed in the November 1995 staff report and Part V of the March 1996 staff report, the load targets described are based on meeting applicable performance goals and water quality objectives. Water quality improvements have only been observed in the San Joaquin River downstream of the Merced River when load reductions take place. To date, there have been no demonstrated improvements in water quality due to Real-Time Management. Should Real-Time Management prove viable, modifications to the Basin Plan and/or waste discharge requirements may be pursued.

Use of TMDLs

Enforceable monthly as well as annual wasteload allocations (selenium load caps) should be used as implementation measures toward full compliance with water quality standards. (Bay Institute, EDF, NRDC; 12/7/95)

We believe that to be approvable the Basin Plan Amendment should provide more clarity on the issue of TMDL adoption and better flesh out the interim phases of TMDL implementation. (USEPA: Strauss, 11/22/95: Page 2, Paragraph 3)

The reduction in selenium load that is required to continue use of the SL Drain should be reflected in table 1A [of the November 1995 staff report]. (USFWS: Frazer, 12/12/95)

We recommend that the Regional Board staff present the TMML to the Board for adoption. Further, we recommend that the Regional Board Staff revise its implementation plan to use the selenium load limits derived from the TMML as the primary selenium control mechanism. These selenium control mechanisms should apply throughout the entire watershed area, not just in individual streams. . . . We recommend that the Regional Board staff revise the language to ensure that load limits are designed not only to meet water quality standards downstream of the Merced, but throughout the watershed. . . . Further, we recommend that the Regional Board adopt the TMML for establishing the selenium load limits which will [be] incorporated into the implementation plan. (USEPA, 1/8/96)

The staff report does include a draft TMDL for selenium in the San Joaquin River below the Merced River inflow. The TMDL methodology will not be used in the first five years of the regulatory program as a consensus proposal from the U. S. Fish and Wildlife Service, the U. S. Bureau of Reclamation, the U. S. Environmental Protection Agency and the San Luis & Delta Mendota Water Authority specified load limitations (Consensus, 1995) and the Regional Board found these adequate for the initial period.

The draft TMDL is preliminary at this time and is considered the first phase of developing a methodology on how to define the extent of load reductions that may be necessary to meet future water quality objectives. This TMDL will not be incorporated into the Basin Plan at this time. If a TMDL forms the basis for the regulatory program after the initial five year consensus approach, the draft TMDL will be updated, as needed, and will go through a full public review process prior to submittal to U.S. EPA. The wording of the Basin Plan Amendment has been modified to reflect this. The March 1996 staff report (CVRWQCB, 1996a) provides more detail regarding how the TMDL could be submitted to the U.S. EPA upon completion of the public review process.

The TMDL methodology uses the best available information and techniques to estimate load reductions that are needed to meet water quality objectives. Load limitations will be used as one of the factors for establishing effluent limits in waste discharge requirements. These effluent limits may need to be consistent with Clean Water Act requirements for implementation of a TMDL. It is unclear whether a formal TMDL is required for a non-NPDES discharge from irrigated agriculture. Not adopting the TMDL into the Basin Plan at this time, allows flexibility in how technology is developed and applied to nonpoint sources.

As stated in the staff report, selenium load limits will not be used to meet objectives in Salt Slough, Mud Slough (north), the wetland supply channels, or the San Joaquin River above the Merced River. Rather, a prohibition of discharge will be the regulatory mechanism.

Land Retirement

Land retirement sounds like a good idea, but it is rather simplistic. Which land has the drainage problem: the land with the tile system or land upslope? We submitted a plan to the Bureau of Reclamation last year to help determine what land will yield the greatest drainage reduction

when it is fallowed. ... Apparently they were not interested in answering this question. (Broadview Water District, 9/26/95: Page 2, Paragraphs 3 & 4)

However Land Purchase / Land retirement is an important first step that must be acted upon by this Board. (Smith, 10/4/95: Page 3, Paragraph 6)

There are many questions that need to be answered in regards to the most effective method for implementing a land retirement program. Issues such as the percentage of upslope contribution, whether the tile lines will need to be plugged, and the cost effectiveness of land retirement should be addressed. Despite these outstanding issues, land retirement is a viable method for reducing selenium loads. The extended compliance schedule should provide the time frame necessary to address many of these questions.

The Regional Board does not have authority over land use and does not have the funds to purchase land. The California Department of Water Resources and the U.S. Bureau of Reclamation both have the legal authority and funds to initiate a land retirement program.

Nor does staff present any serious discussion of land retirement or precluding water delivery to areas discharging contaminated drainwaters. (Patagonia, 12/5/95)

Staff has discussed land retirement as an option in its August 1995, November 1995 and March 1996 staff reports. The Basin Plan amendment language does state that the Regional Board will request the State Board (which has authority over water rights) to review the preclusion of water supplies if compliance does not occur by the dates specified and Regional Board administrative remedies fail to achieve compliance.

Land Use

Discourage increasing acres in production and limiting double cropping until objectives are met. (USFWS: Medlin, 10/4/95: Page 4, Paragraph 5; Paragraph 1)

The regulatory program is framed to focus on meeting water quality objectives and not on regulating land use or economic activity in the region, over which the Regional Board has no authority. Establishing a regulatory program that will involve a high cost and including a provision that restricts revenue would put the dischargers in an unworkable situation. It should also be noted that double cropping can provide significant environmental benefits, although additional water is used. Wind erosion is prevented, weeds are kept down (requiring less herbicides later), and organic material is added to the soil profile.

Treatment

To date, a cost effective treatment process has not been identified. (Broadview Water District, 9/26/95: Page 2, Paragraph 3)

Several people at the Workshop suggested that technology is available to solve the drainage problem. They never identify the technology or verify that it is economically feasible. To the best of our knowledge, an affordable technological solution is not yet available. (Broadview Water District, 12/8/95)

The technology required to achieve the 5-ppb, 4-day average selenium concentration standard on October 1, 2005 is not yet available. (SLDMWA, 12/11/95)

Expert testimony provided for Westlands Water District during recent litigation indicated that some cost effective treatment technology was available (see Appendix 3 in the March 1996 staff report). Since cropping patterns are similar in Westlands and the Drainage Problem Area, such a process should also be cost effective in the Drainage Problem Area. The time needed to develop a full-scale treatment process is reflected in the extended time schedule allowed.

Many other selenium load reduction technologies are still in the research and development phase. If such technologies were currently available for implementation, a more stringent compliance time schedule would be adopted. At this time, even the most promising new treatment technology is not able to reduce selenium levels to the point where water quality objectives could be met in Mud Slough (north) due to the slough's limited assimilative capacity.

Extending the Bypass

Comment summary: The District strongly opposes any extension of the Drain to the San Joaquin River beyond the confluence of the Merced River or the Delta. If the Field Experiment [five year Grassland Bypass project] is successful, the federal water quality standard in Mud Slough (north) should be met. (Contra Costa Water District, 10/4/95: Page 4, Paragraph 1) ... there is no justification for extending the existing San Luis Drain. (Contra Costa Water District, 12/7/95)

As discussed in the March 1996 staff report, the only method currently available for meeting water quality objectives in Mud Slough (north) is to remove subsurface drainage discharge from the slough. When drainage is present in Mud Slough (north) water quality objectives are exceeded, regardless of the mass loading, due to the limited assimilative capacity of the slough. Even the most promising new treatment technology is not able to reduce selenium levels to the point where water quality objectives could be met in Mud Slough (north). The San Joaquin Valley Drainage Program Final Report (SJVDP, 1990) also recognized that removal of drainage was the only alternative to meeting objectives in Mud Slough (north) and recommended construction of a conveyance facility which would discharge downstream of the Merced River.

The Regional Board does not have the authority to approve or disapprove the construction of a conveyance facility. The Board's authority is limited to regulating the discharge. The Regional Board is not approving the Bypass in this Basin Plan amendment but merely recognizing it as a means by which water quality objectives may be met.

We request that the Regional Board acknowledge the need for this new facility [extension of the Grassland Bypass], and include language in the Basin Plan Amendment noting that it may not be possible to improve water quality in Mud Slough (North) until that facility is constructed. (SLDMWA, 12/11/95)

The prohibition language specifically states that the prohibition of discharge into Mud Slough (north) may be reconsidered if public or private interests prevent the implementation of a separate conveyance facility to the San Joaquin River.

Withholding Supply Water

... the Board should act to preclude the supplying of water to areas that discharge to Grassland wetlands... (Bay Institute, 10/2/95: Page 3, Paragraph 4)

After seven years of not meeting objectives the Regional Board should request the State Board to begin using its water rights authority and incrementally restrict water supplies as drainers do not meet load reductions. (USFWS: Medlin, 10/4/95: Page 5, Paragraph 4)

.. we would like the Regional Board to describe the specific circumstances under which it would request the withholding of irrigation water.... (Contra Costa County, 10/4/95: Page 3, Paragraph 3)

Page 27, Table 7 - SWRCB, #1 [withholding supply water]. This potential control action should be stated more strongly... (Bay Institute, 10/2/95: Page 5, Paragraph 22)

Additional elements of a regulatory program that should be considered are: . . . Recommendations to limit water deliveries under reasonable and beneficial use laws if compliance schedules are not met. (USFWS: Medlin, 10/4/95: Page 4, Paragraph 5)

The Regional Board does not have the authority to address water rights issues. Water rights are under the auspices of the State Water Resources Control Board. The control action has been revised to state more explicitly the conditions under which the Regional Board will request that the State Water Board preclude the supplying of water.

Water Conservation Efforts

Deleted Actions 2 & 4 - Why have all references to water conservation efforts been removed from this section? (USFWS: Medlin, 10/4/95: Page 5, Paragraph 5)

The action requiring water districts to supply water conservation reports to the Regional Board is no longer valid as the program is now conducted by the California Department of Water under AB3616: Efficient Water Management for Water Suppliers. The action prioritizing water conservation grant funds is no longer valid since the funding source has been exhausted.

TIME SCHEDULE FOR COMPLIANCE

When the Regional Board prepares its program of implementation for achieving the water quality objectives, it [is] essential to include a compliance time schedule which will ensure that the objectives are met in a timely manner. (Stockton East, 7/7/95)

The schedule for compliance with water quality objectives proposed in the Staff Report is grossly inadequate. Allowing a period of twenty to twenty-five years for compliance violates the federal Clean Water Act by permitting continued and increased degradation of water quality... We strongly urge the Board to establish in the basin plan a preset, phased, aggressive schedule for achieving selenium load reduction milestones in order to discharge its obligations under the federal Clean Water Act and achieve full compliance with water quality standards for selenium in a timely manner (i.e., a period no longer than five to seven years). (Bay Institute, 10/2/95)

The District recommends that all the selenium concentration limits in Table 11 be enforced and complied with as of October 1, 2000. (Contra Costa Water District, 10/4/95: Page 4, Paragraph 3)

Comment summary: The compliance dates for the San Joaquin River should be moved up to a much earlier compliance date. (Contra Costa County, 10/4/95: Page 2, Paragraph 2)

Comment summary: The selenium objective [in the San Joaquin River] should be effective immediately. The staff proposal is incompatible with the Environmental Protection Agency's requirements. The Board should issue a compliance schedule that requires the achievement of the monthly drainage loads for a one-in-five-month exceedance rate within five years. (EDF, 10/4/95: Page 2, Paragraph 2)

The Board is simply setting an ambiguous compliance schedule that is essentially a moving target. (Porgans, 10/3/95: Page 2, Paragraph 1)

The San Luis & Delta-Mendota Water Authority and the Grassland Basin Drainers believe the Regional Board should retain the proposed compliance time schedule,... (SLDMWA, 10/4/95: Page 2, Paragraph 3)

... requirements for meeting the regulations [beneficial use designations] not be imposed on the discharge of subsurface drainage until practical alternative means of discharge are available. (CA Farm Bureau, 7/6/95)

A 5 to 7 year implementation/compliance schedule is reasonable... (Smith, 10/4/95: Page 4, Paragraph 5)

The Regional Board's extended schedule to meet selenium water quality standards in the San Joaquin River and Mud Slough by the year 2020 is unacceptable! ... A five to seven year maximum time frame for achieving compliance with the proposed discharge standards is more desirable. (USFWS: Zahm, 10/4/95: Page 2, Paragraph 3)

The Regional Board's extended schedule to meet selenium water quality standards in the San Joaquin River and Mud Slough by the year 2020 is extremely and unacceptably protracted. (USFWS: Medlin, 10/4/95: Page 2, Paragraph 1)

With a 5% reduction per year starting at the 6,600 lbs/yr level... and the extension of the bypass to below the Merced River, compliance could be met in all water bodies in 10 years. (USFWS: Medlin, 10/4/95: Page 2, Paragraph 3)

Para 3 - Continued degradation of the San Joaquin River and Mud Slough is expected but this should be carefully monitored and be viewed only as an interim condition (i.e. 5 years). The Regional Board should not allow the continued degradation of this slough beyond the year 2000. (USFWS: Medlin, 10/4/95: Page 6, Paragraph 6)

We are opposed to Alternative 2 and 3 because they do not address the impending impacts of agricultural drainage water on downstream water users and public trust resources in a reasonable time period. (Porgans, 12/8/95)

*I urge the Board to reconsider this schedule and impose more stringent requirements for reducing selenium loads in the San Joaquin River and Mud Slough. (Miller, 12/7/95)
... we would prefer still more aggressive implementation schedules both above and below the Merced river confluence. (USFWS: Medlin, 12/7/95)*

The maximum time period allowed for compliance has been revised to 15 years. Additionally, a series of increasingly more stringent performance goals will apply. This program will lead to continual improvement in water quality prior to full compliance. Prohibitions apply which insure that the selenium load to the San Joaquin River will not exceed historic levels prior to achieving

water quality objectives. Water quality objectives will either be achieved in Mud Slough (north) by 1 October 2010 or a prohibition of subsurface agricultural discharge to that water body will also apply.

As discussed in the March 1996 staff report many of the technologies recommended by the San Joaquin Valley Drainage Program are still in the development stage. Irrigation improvements have been largely implemented in the Drainage Problem Area, but have not resulted in achievement of water quality objectives. The other technologies will take time to develop and implement. It is highly unlikely that those technologies can be developed and implemented in a short time frame.

The staff report estimates that annual selenium loads must be less than 1,100 lbs in dry years and less than 3,100 lbs in wet years before compliance with a 5 $\mu\text{g/L}$, 4-day average occurs. This is an 80% reduction in dry years and a 47% reduction in wet years. At a rate of reduction of 5% per year selenium loads would be below 3,100 lbs in water year 2008 and below 1,100 lbs in water year 2014.

Considering that the short term use of an existing facility has taken over five years to implement, it seems unrealistic to expect that the long-term use of an expanded wetland bypass project can be implemented in less than five years. Besides the financing difficulties, the NEPA/CEQA process will be protracted - as evidenced by the interim use of the San Luis Drain project.

Compliance with water quality standards for selenium in the San Joaquin River and Mud Slough (north) should be achieved in a shorter time frame than the proposed 10-15 year period in order to fully discharge the requirements of federal and state law. (Bay Institute, EDF, and NRDC; 12/7/95)

... U.S. EPA does not believe that a basin plan amendment allowing for a 20 or 25-year compliance schedule would be approvable by U.S. EPA in its review under the Clean Water Act. (USEPA: Strauss, 11/22/95: Page 2, Paragraph 1)

The Regional Board is not aware of any requirements under either federal or state law that places restrictions on the compliance time period. The compliance schedule specified in the Basin Plan amendment meets water quality objectives in the shortest time period reasonably achievable. The Basin Plan language has been revised to specify that the compliance schedules apply only to non-point sources. Should any point sources contributing to the Grassland or San Joaquin River selenium problem be identified, alternative shorter compliance schedules may be appropriate.

The Regional Board should at least shorten the compliance period to require compliance with the objectives for the San Joaquin River below the Merced River by 1 October 2002, and compliance with the objectives for the San Joaquin River above the Merced River and Mud Slough (north) by 1 October 2005. (Contra Costa Water District, 12/7/95)

A shorter compliance schedule (5-7 years) is considered in the evaluation of alternatives in the Basin Plan March 1996 staff report. The evaluation showed that a compliance schedule that is significantly shorter than the 10-15 year schedule proposed would require implementation of alternatives that have not yet been thoroughly developed. This immediate implementation could lead to little environmental improvement with great expenditure of funds.

It is hard to understand what the Board anticipates will happen between termination of the agreement in 2000 and final selenium reductions in 2010. (Miller, 12/7/95)

The Basin Plan Amendment includes concentration based performance goals for the San Joaquin River downstream of the Merced River. Load limits will be incorporated into WDRs to achieve performance goals and water quality objectives. The Regional Board anticipates that there will be continual improvements in water quality from 2000 to 2010.

... we are requesting that the Compliance Time Schedule be modified as shown in Table 1. (SLDMWA, 12/11/95) [Where the staff proposal and Water Authority proposal differ, brackets are used to indicate the staff proposal].

<i>Water Body/Year Type</i>	<i>1 October 1996</i>	<i>1 October 2002</i>	<i>1 October 2005</i>	<i>1 October 2010</i>
<i>Salt Slough and Wetland Water Supply Channels</i>	<i>2 µg/L monthly mean</i>			
<i>San Joaquin River below the Merced River; Above Normal and Wet Water Year types</i>		<i>5 µg/L monthly mean</i>	<i>5 µg/L monthly mean [5 µg/L 4-day avg.]</i>	<i>5 µg/L 4-day avg.</i>
<i>San Joaquin River below the Merced River; Critical, Dry, and Below Normal Water Year types</i>		<i>8 µg/L monthly mean</i>	<i>8 µg/L monthly mean [5 µg/L monthly mean]</i>	<i>5 µg/L 4-day avg.</i>
<i>San Joaquin River above the Merced River and Mud Slough (north)</i>				<i>5 µg/L 4-day avg.</i>

The March 1996 staff report indicates that significantly less load reduction will be required in wet years versus dry years. Therefore, compliance in wet years should be achievable in a much shorter time frame than compliance in dry years. The Regional Board concluded that the additional (more stringent) performance goal in dry year types is necessary to ensure continual improvements in water quality until water quality objectives are achieved.

We recommend that the Regional Board staff revise the implementation plan to only provide authority to grant a compliance schedule of up to 10 (or 15) years. . . . we recommend that the staff provide greater scientific justification for the extended schedule, given the immediate availability of many load reduction tools. (USEPA, 1/8/96)

- a) A detailed analysis of alternative compliance schedules and regulatory mechanisms is provided in the Basin Plan amendment March 1996 staff report in both Part V and Appendix 2. This analysis supports the maximum compliance schedules proposed.
- b) The Basin Plan language has been revised to specify the maximum compliance schedule allowed for this program.
- c) In the analysis of potential load reduction alternatives, two of the alternatives require further development prior to wide scale implementation; agroforestry and treatment. In practical terms, a third alternative, land retirement, would also take time to implement. A successful land retirement program has three components: 1) adequate funding; 2) adequate

characterization of the most appropriate lands to retire; and 3) willing sellers of the land targeted for retirement. These three components have only been partially addressed.

COMPLIANCE MONITORING

Where is the monitoring program.... Any monitoring program must be reviewed by the public and be conducted by a recognized inventory or research entity,... (Smith, 10/4/95: Page 7, Paragraph 3)

What State authorities and trust responsibilities would be transferred to the managing body? If monitoring is included, this would be like letting the fox guard the hen house. (Smith, 10/4/95: Page 6, Paragraph 8)

The Regional Board has had an ongoing monitoring program since 1985. Numerous reports have been published and are available to the public. The Regional Board does not have the authority to require an entity other than the dischargers to conduct a monitoring program. Additionally, the Regional Board does not have the funds to support a monitoring program by another agency. Self monitoring by the discharger is the normal mechanism employed by the state to determine compliance with WDRs. There are no proposals contained in the staff report to transfer State regulatory responsibilities. Monitoring of receiving water is currently conducted by the Regional Board and individual district drains are monitored by both the Regional Board and districts. Continuation of the Regional Board's monitoring program will depend on the availability of funds.

We suggest the biota data should also be considered by the Board in its regulatory capacity. (USFWS: Medlin, 12/7/95)

In assessing the success of the Basin Plan Amendments, the Regional Board will consider all available biota data.

ECONOMICS

We recommend that the Regional Board encourage the dischargers to use economic incentive programs to assure compliance. (EDF, 10/4/95: Page 4, Paragraph 3)

The Basin Plan Amendment now has a control action that encourages the use of economic incentives to achieve pollutant load reductions.

We recommend that the Regional Board staff develop language which makes clear the long term investments which are likely to be necessary to control selenium discharges. (USEPA, 1/8/96)

The Basin Plan amendment March 1996 staff report provides information on the potential cost of the selenium control program. In addition, the San Luis & Delta-Mendota Water Authority has provided an economic analysis of the control program which has been reviewed by the State Water Resources Control Board, Economics Unit. The information presented has been summarized in the Basin Plan Amendment.

Maintaining Crop Productivity

How do you go to higher value crops when soil salinity is increasing? (Broadview Water District, 9/26/95: Page 2, Paragraph 6)

... it will be difficult to maintain or improve crop yields in districts where a significantly larger proportion of the total subsurface drain water volume must be recirculated to achieve necessary reductions in selenium loads. (SLDMWA, 10/4/95: Page 9, Paragraph 3)

A number of alternatives to reduce selenium load was evaluated including those recommended by the San Joaquin Valley Drainage Program (SJVDP). Reuse was not considered in this amendment and it was a small component of the SJVDP recommendations. It would appear that large scale reuse would be the most economically damaging response to selenium load reduction targets. Plugging tile lines (as in Westland Water District) would result in slower rate of crop yield reduction versus the rapid salinization of soil associated with large scale reuse. Many of the alternatives recommended by the San Joaquin Valley Drainage Program were intended to prevent salinization of soil.

SALINITY

When will the Regional Board establish salinity standards? (USFWS: Medlin, 10/4/95: Page 5, Paragraph 3)

Regional Board will begin the process for setting water quality objectives and developing an implementation program for salinity in the San Joaquin River upstream of Vernalis in early 1996.

Se should be the first priority, but boron, overall salinity, and ionic imbalance are also significant issues especially to downstream water users (Delta farmers, municipalities, etc). A policy statement should address these drainwater constituents also. (USFWS: Medlin, 10/4/95: Page 3, Paragraph 6)

Of critical concern to Stockton East is ... the effects of increased concentrations of salinity in the river. (Stockton East, 7/7/95)

Salinity, sulfates, other trace elements, and atypical ion ratios in drain water are also significant factors to consider in evaluating aquatic life criteria as these alone can also be toxic. (USFWS: Medlin, 7/12/95)

We believe that addressing the selenium problem without also addressing the river salinity problem may result in adopting measures for selenium control that may have to be revised,... in order to be economically and physically compatible with salinity and boron control in the river. (South Delta Water Agency: Hildebrand, 9/12/95: Page 1, Paragraph 2)

The SOUTH DELTA WATER AGENCY ("SDWA") continues to believe that the current water quality objectives and implementation plan for subsurface drainage are inadequate because of their failure to address and control high salinity discharges into the San Joaquin River. (South Delta Water Agency: Herrick, 10/4/95: Page 1, Paragraph 1)

The SDWA encourages the Regional Board to address the salinity problem at this time so that the downstream users who continue to be harmed by upstream CVP operations do not have to

wait another 20 years before they begin to see the light at the end of the tunnel. (South Delta Water Agency: Herrick, 12/7/95)

This Basin Plan Amendment deals only with selenium. Future basin plan amendments will deal with salinity and other trace elements of concern.

The selenium problem is localized to a 90,000 acre area, whereas, the problems associated with salt encompass the entire west side of the San Joaquin River Basin. Therefore, the control programs for selenium and salt do not necessarily have to be identical for successful compliance with water quality objectives.

Establishing an Objective

The Central Delta Water Agency urges that a salinity objective be established for the San Joaquin River upstream of Vernalis. (Central Delta Water Agency, 9/29/95)

Stockton East believes that it is critical to establish water quality objectives for salinity for the entire San Joaquin River,... (Stockton East Water District, 10/4/95: Page 1, Paragraph 1; Page 2, Paragraph 2)

Stockton East strongly urges the Regional Board to establish water quality objectives for salinity for the entire San Joaquin River, not simply at Vernalis. (Stockton East Water District, 12/8/95)

The current Basin Plan Amendments for agricultural subsurface drainage are focused on the development and implementation of selenium water quality objectives. Porter-Cologne requires the development of an implementation plan for water quality objectives (Water Code Section 13242). Such an implementation plan for salinity objectives will involve water rights issues. The development of a program of implementation will, therefore, require the involvement of the State Water Board along with the Regional Board.

The complexity of an implementation program for salinity objectives will take a great deal of time and require the input of many interested parties. The Regional Board believes it would be more appropriate to focus on the priority constituent of concern, selenium, during this amendment process. The Regional Board will then be able to focus its limited resources towards development of salinity water quality objectives and an implementation program during a future amendment process.

Wetland Management

Unless the Regional Board can be more specific as to what managed wetlands are part of the problem, the Service requests that reference to wetland management be removed from the policies table and all other areas of the report that implicates it as part of the problem. (USFWS: Medlin, 10/4/95: Page 4, Paragraph 1)

The Grasslands Water District knowingly accepted drainage water high in dissolved solids and boron prior to the discovery of the problems associated with selenium. Additionally, the water supply for the majority of the wetlands originates from outside of the San Joaquin River Basin. This importation of salt leads to impacts on downstream beneficial uses. To the extent that application of water on wetlands leads to leaching of salts or importation of salt, they contribute to the salt problems in the San Joaquin River Basin.

GENERAL

Summary: It was noted that an additional bullet item was needed on page 11 of the staff report which acknowledges that installation of tile drains was an impact of the Central Valley Project (CVP) in the Grassland watershed (South Delta Water Agency comments at 23 June 1995 workshop).

The suggestion of an additional bullet item to acknowledge the direct impact of the CVP on the installation of tile drains has been incorporated.

Terminology

We recommend that the Regional Board staff define these terms ["the sensitivity of the beneficial use to selenium" and "the environmental benefit expected from the action"]. (USEPA, 1/8/96)

Further clarification of these terms has been provided in the March 1996 staff report.

Load Estimates

It is inappropriate to use an estimate for the years 1975-1985. (Broadview Water District, 9/26/95: Page 3, Paragraph 4)

Use of the 1986 to 1994 baseline rewards the drainer / polluters and short changes the protection of the public trust. The Staff or Board should consider using the average selenium loading of the San Joaquin River 1950 to 1975 as the historical time frame or reference rather than the 1986 to 1994 period. (Smith, 10/4/95: Page 5, Paragraph 4)

The estimates of selenium loading in the 1975-1985 time period is based on two factors: 1) the number of tile drained acres and 2) the age of the tile system. In general, newer tile systems will leach greater amounts of soluble materials until an equilibrium is reached. Based on these two factors, a calculation of equivalent acres tile drained was made. The peak equivalent acres tile drained occurred in 1983. Since that time, the equivalent tile drained acres has decreased. Equilibrium should be reached by this year, if no new lands are tile drained. It was assumed that equivalent acres tile drained could be correlated with load discharged. Based on that assumption comparisons between the 1986-1994 time period and the 1975-1985 time period were made. Note that a comprehensive record of actual selenium loads is only available for the 1986-1994 time period.

I respectfully request that the board not take any action on the proposed amendment to the WOCP until it has a "round table" workshop to further explore the source and/or accuracy of the selenium numbers contained [in] its staff report [in Appendix B of the August 1995 staff report] and those contained in the USBR Use Agreement. (Porgans, 12/8/95)

The Regional Board agrees that a more thorough evaluation of selenium transport within the Grassland watershed and impacts of selenium load reduction alternatives has merit. Such studies will be most useful during the demonstration phase of load reduction alternatives. The Regional Board believes that adoption of the proposed amendments will provide the incentive to demonstrate load reduction alternatives and to conduct the studies suggested while at the same time providing an immediate improvement to water quality in the wetland supply channels.

We recommend that the Regional Board staff provide an explanation of the changes to the table [describing estimated percentage change in selenium load within each month for various water year types to meet a 5 µg/l 4-day average selenium water quality objective based on a one in three year rate] as well as a general explanation of the method by which the table was derived. (USEPA, 1/8/96)

The table in question was derived using a baseline equivalent to that used in the consensus letter submitted to the Region Board by the U.S. EPA, U.S. Fish and Wildlife Service, U.S. Bureau of Reclamation, and San Luis & Delta-Mendota Water Authority (Consensus, 1995). The baseline (as stated in the footnote to the tables) is the average selenium load in Mud Slough (north) and Salt Slough over water years 1986 to 1994. The selenium loads that must be met to meet objectives are in Tables 10a and 10b of the March 1996 staff report for dry and wet years, respectively. The percent change is calculated as:

$$\frac{[\text{Wet(or dry) Allowable Load} - \text{Historical Average Load}]}{\text{Historical Average Load}}$$

San Joaquin River Flow Augmentation

Comment summary: If toxicants from the drainage are going to be reduced to a level that will not harm beneficial uses, why not allow the discharge to go into the San Joaquin River to augment flow? (Contra Costa Water District, 10/4/95: Page 2, Paragraph 3)

Even if all of the toxicants were removed, significant levels of dissolved solids would remain in the drainage. These high levels of dissolved solids may impair beneficial uses in the San Joaquin River, but would not impair a water body that was naturally high in dissolved solids.

Evaporation Ponds

... the Board should make it clear that no new evaporation ponds will be allowed to receive drainwater whose selenium concentrations exceed 2 µg/L. (EDF, 10/4/95: Page 2, Paragraph 2)

The Service recommends elimination of evaporation ponds from consideration ... (USFWS: Medlin, 10/4/95: Page 5, Paragraph 2)

The San Joaquin Valley Drainage Program Final Report suggested accelerated evaporation ponds as a component of a drain water management system. An appropriately designed system would have no or minimal environmental impact, and would be regulated under waste discharge requirements. It is not appropriate at this time to eliminate evaporation ponds as a possible component of a drainage water management system.

Load Reductions vs. Water Quality

Earlier staff reports also stated that "load reduction" does not lead to water quality improvement due to the fact that irrigation efficiency has been maximized. (Porgans, 10/3/95: Page 4, Paragraph 3)

We believe that using selenium load controls does not appear to be the appropriate way of achieving water quality goals. Actions instituted to limit loads can actually increase concentrations resulting in even worse river quality at various times of the year. (South Delta Water Agency: Herrick, 12/7/95)

Previous staff reports have demonstrated that water quality in the San Joaquin River downstream of the Merced River does improve in response to load reductions. In general, water quality in Mud Slough (north), Salt Slough and the San Joaquin River between Salt Slough and the Merced River does not improve in response to load reductions due to limited assimilative capacities.

Calculated Load Reductions

The Staff Report [August 1995] includes a discussion of alternative drainage reduction scenarios to demonstrate the feasibility of achieving selenium load reduction goals (Appendix B). While the general intent of that analysis is valid, some of the key assumptions are oversimplified and the results give an incorrect impression that selenium load reductions can be achieved with little effort and minimal cost by farmers and districts. (SLDMWA, 10/4/95: Page 4, Paragraph 4)

The intent of the analysis in Appendix B was to provide a screening level analysis of the technical feasibility of achieving water quality objectives. There was no discussion of the level of effort or cost associated with implementing those alternatives. Appendix B has been revised for clarity and is included in the March 1996 staff report as Appendix 3.

Proportioning Selenium Loads

The Regional Board goes on to propose that land draining to the top 5 selenium producing sumps in each district be retired...is it 5 sumps from each district or 5 sumps total for the Grasslands areas? (USFWS: Medlin, 10/4/95: Page 7, Paragraph 4)

Based on limited data available on selenium loads from sumps, it has been observed that five sumps in a single district in the Grasslands area produce the quantity of load indicated in the report. It was assumed that each sump effectively drained 600 acres of land. The actual acreage may be slightly more or less.

Other Constituents of Concern

The District is concerned that this [prioritizing the regulation of selenium] has resulted in a delay in the Regional Board's efforts in seeking the reduction in other contaminants such as salinity and boron. [and] . . . The District also requests that the Regional Board increase its efforts to regulate pesticides such as diazinon. (Contra Costa Water District, 12/7/95) . . . the Regional Board should consider setting a diazinon objective for the San Joaquin River. (USFWS: Medlin, 10/4/95: Page 3, Paragraph 3)

. . . pesticides in the San Joaquin River are not from the Grasslands Basin. (Broadview Water District, 12/8/95)

The selenium problem is relatively localized to the 90,000 acre problem area. Sources of high levels of boron can be found throughout the Grasslands watershed, including wetlands. Salinity concentrations in the San Joaquin River are highly dependent on the amount of flow and the discharges from saline areas, which includes most of the west side of the San Joaquin River valley. The impacts of boron and salt are generally limited to agricultural impacts, whereas, fish and wildlife are most sensitive to selenium. The impacts from pesticides are also widespread and the differences in areal extent and beneficial uses impacted will likely require different regulatory approaches and will involve many more interested parties. For example, the Regional Board is working with the Department of Pesticide Regulation to address the pesticides detected in the

river. The Regional Board does not currently have the resources to address all contaminant issues in the San Joaquin River simultaneously.

. . . we recommend that the Regional Board staff provide greater scientific justification for the proposed boron control program, particularly for the critical year relaxation and the elevated allowable concentration for Salt Slough. . . . we recommend that the Regional Board staff develop a control strategy for boron and any other constituent whose standard is regularly exceeded. (USEPA, 1/8/96)

The Basin Plan Amendments for agricultural subsurface drainage discharges are focused on the control of selenium. No new boron objectives or compliance time schedule for control of boron has been proposed. Existing boron objectives were adopted in 1988 and have been approved by the State Water Resources Control Board. Although the U.S. EPA did not approve the current boron objectives, new boron standards have not been promulgated. Therefore, the current objectives remain in effect.

APPENDIX 1
Copies of Comment Letters Received at
Public Workshops

